

Power Macintosh 4400

Power Macintosh 4400/200 and 4400/200 PC
Far East: Power Macintosh 7220/200 and 7220/200 PC
Europe Only: Power Macintosh 4400/160





Basics

Power Macintosh 4400



System Overview

The Power Macintosh 4400 is an entry-level computer with a PowerPC 603e processor. The adapter card in the 4400/160 allows installing three PCI cards. In later models the adapter card allows installing one communications card and two PCI cards.



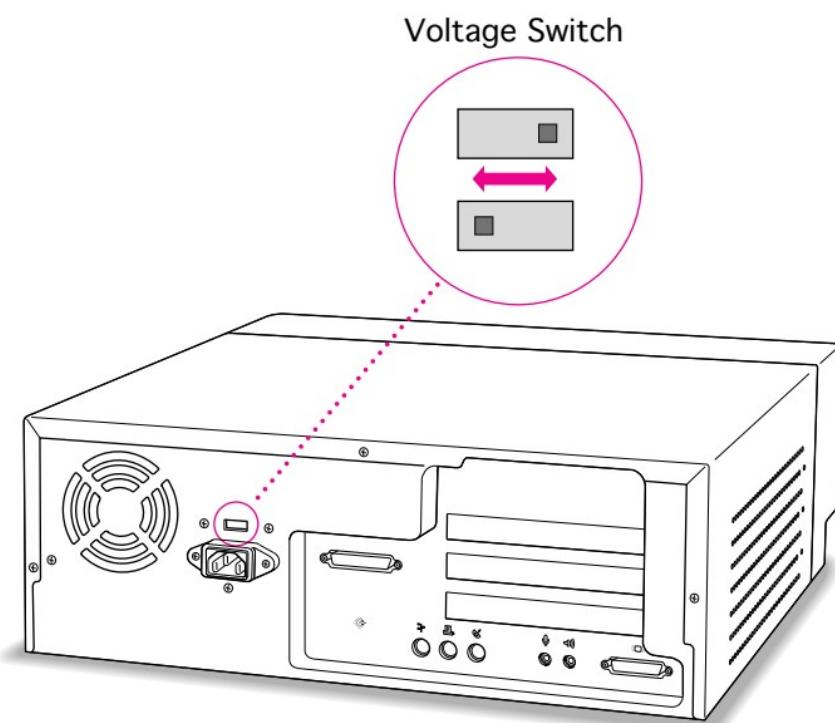
The computer can be turned on or off from the keyboard and from the power button. A voltage switch allows manual selection of two settings for voltage ranges of 100–130V or 200–230V.



Power Macintosh 4400/200, 7220/200

The Power Macintosh 4400/200 will be sold worldwide. In the Far East, it will be named 7220/200. These computers have the same features as the Power Macintosh 4400/160, with these exceptions:

- Communications slot II on the PCI adapter card
- Two PCI card slots on the PCI adapter card
- 200 MHz processor clock
- Maximum memory expansion of 160 MB



Voltage Switch

The voltage switch must be set correctly to avoid damaging the computer. Insert a screw driver in the slot to set the switch to show “115” for voltages between 100 and 130. Set the switch to show “230” for voltages between 200 and 230. Some countries use two standardized voltages. If you aren’t sure which voltage is available, check with the electricity supply company before plugging in the computer.





Here is a table listing voltages for some countries:

Country	Voltage
Japan	100
South Korea	100 or 220
Jamaica, Taiwan	110
Peru	110 or 220
Brazil, Lebanon	110-220
Philippines	115
Bermuda, Canada, Puerto Rico, United States, Venezuela	120
Mexico	127
Saudi Arabia	127 or 220
Hong Kong	200





Country	Voltage
India, South Africa	220-250
Israel, Pakistan, Singapore	230
Australia, Kuwait, Malta, New Zealand, Northern Ireland, Papua New Guinea, Oman, Qatar, United Kingdom	240
Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	220-230
Bahrain, Chile, China (People's Republic), Czechoslovakia, Egypt, Greenland, Hungary, Iceland, Indonesia, Iran, Jordan, Liechtenstein, Nepal, Paraguay, Poland, Romania, United Arab Emirates, Russia and the Commonwealth of Independent States (CIS), Yemen, Yugoslavia	220





Caution: Setting the correct voltage for the computer does not set the voltage for the monitor. To protect the monitor, be sure to use the appropriate adapter or voltage converter, if one is necessary.



Key Commands

Since there are no programmer's switches on the Power Macintosh 4400, the reset and interrupt functions require pressing key combinations. There are two power buttons on the 4400, one on the keyboard and one on the front of the computer (see the Front View diagram later in this chapter). The keyboard power key is identified by a triangle imprinted on it.

Press these key combinations for at least one second while holding down the power key found on the keyboard:

Function	Key(s)
Interrupt	Command
Reset	Control-Command



CD-ROM and Hard Drive Interface

The internal hard drive uses intelligent device electronics (IDE) technology, commonly used in DOS-compatible systems. The IDE drive uses the standard advanced technology attachment (ATA) or IDE interface. The IDE hard drive functions the same as a typical SCSI hard drive. You must replace IDE drives like for like. The IDE drive does not affect SCSI ID selections or SCSI termination schemes. Seven external SCSI devices may be daisy-chained through the external SCSI port.

The CD-ROM drive uses the advanced technology adapter peripheral interface (ATAPI), not SCSI. The ATA and ATAPI interface schemes could be incompatible with some disk utility programs.



Peripheral Component Interconnect (PCI) Technology

The Power Macintosh 4400 offers peripheral component interconnect (PCI) expansion. Because the PCI bus is an industry standard, most existing PCI 2.0-compliant cards (with the addition of a Macintosh OS-specific software driver) will work in these computers.

PCI offers significantly higher performance than the NuBus architecture used in previous Macintosh models. Running at 33 MHz, the PCI bus is up to three times faster than NuBus, offering overall enhanced system performance, particularly in the areas of video and networking.

PCI expansion cards are mounted horizontally in an adapter card.





Note: The Power Macintosh PCI adapter card expansion slots are compatible with all PCI 2.0 specification-compliant cards with the addition of a Macintosh-OS-specific software driver. Nubus cards **cannot** be used in these expansion slots. PDS cards for the Macintosh LC family, the Macintosh Quadra 630 computer, or cards that operate in the I/O expansion slot in Power Macintosh 5200 and 6200 computers are **not** compatible with the PCI adapter card expansion slots.



Dual In-Line Memory Modules (DIMMs)

The Power Macintosh 4400 uses DRAM on dual in-line memory modules (DIMMs). Three slots allow for memory expansion up to 96 MB using 3.3 V unbuffered 8-byte extended data output (EDO) JEDEC-standard 168-pin DRAM DIMM cards. DRAM expansion slot 1 only supports single-bank DIMMs. DRAM expansion slots 2 and 3 support both single-bank and dual-bank DIMMs. No DRAM is soldered on the logic board.

Important: The single in-line memory modules (SIMMs) used in previous Macintosh models are **not** compatible with 4400 models. **Don't** use DIMMs that support a 4K refresh rate. Use 168-pin, 3.3 V unbuffered EDO, 60 ns or faster DIMMs. Also, the JEDEC MO-161 specification shows three possible heights for the EDO DIMM. For Macintosh





computers, use only the shortest of the three (1.100 inches). Taller DIMMs put excessive pressure on the DIMM sockets due to mechanical pressure inside the case.

The DIMMs can be installed one or more at a time. In the 4400/160 each DIMM slot can support up to a 32 MB bank of memory. In the 4400/200 and 7220/200, the first DIMM slot supports up to a 32 MB bank and the other two support up to 64 MB in each. The logic board supports only linear memory organization. The combined memory of all of the DIMMs installed will be configured as a contiguous memory space.



Video RAM

The logic board has a 120-pin video DIMM connector that allows the use of EDO RAM. The video controller supports the following for video memory:

- 1 or 2 MB of EDO RAM
- 1, 2, or 4 MB of SGRAM

PC Compatibility Cards

Apple computer offers PC Compatibility Card upgrade kits that bring full DOS functionality to the Power Macintosh 4400 computers. The cards plug into any available PCI slot on the logic board. Refer to the PC Compatibility Card manual on this Service Source CD for more information and installation instructions.





GeoPort Technology

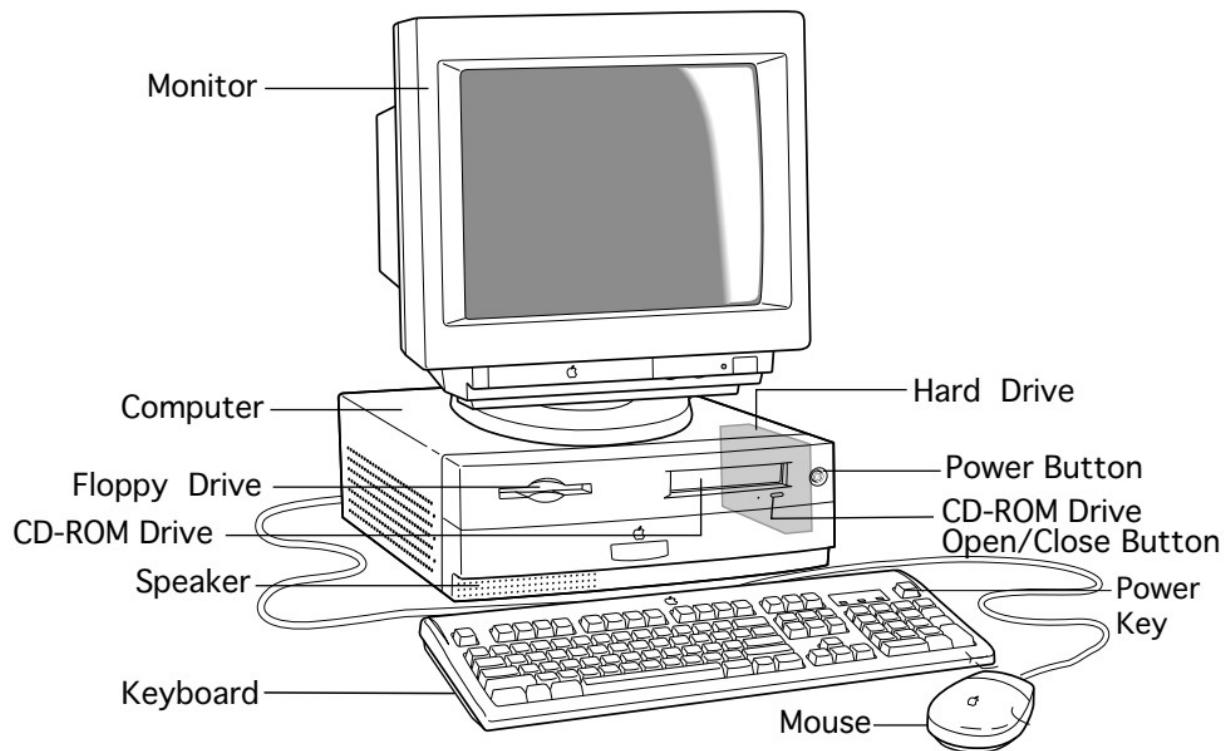
Geoport is a hardware and software communications architecture that has been optimized for computer-telephony integration. It has three main attributes:

- It lets any GeoPort-compatible computer connect to any telephone (analog or digital, public or private) anywhere in the world.
- Once connected, it supports an arbitrary number of independent data streams up to a total bandwidth of 2 MB/second.
- Unlike traditional asynchronous data communications (such as AppleTalk), GeoPort also supports isochronous data streams (such as real-time voice and video) and provides the real-time application program interfaces (APIs) necessary to hide the implementation details from both the recipient and the sender.



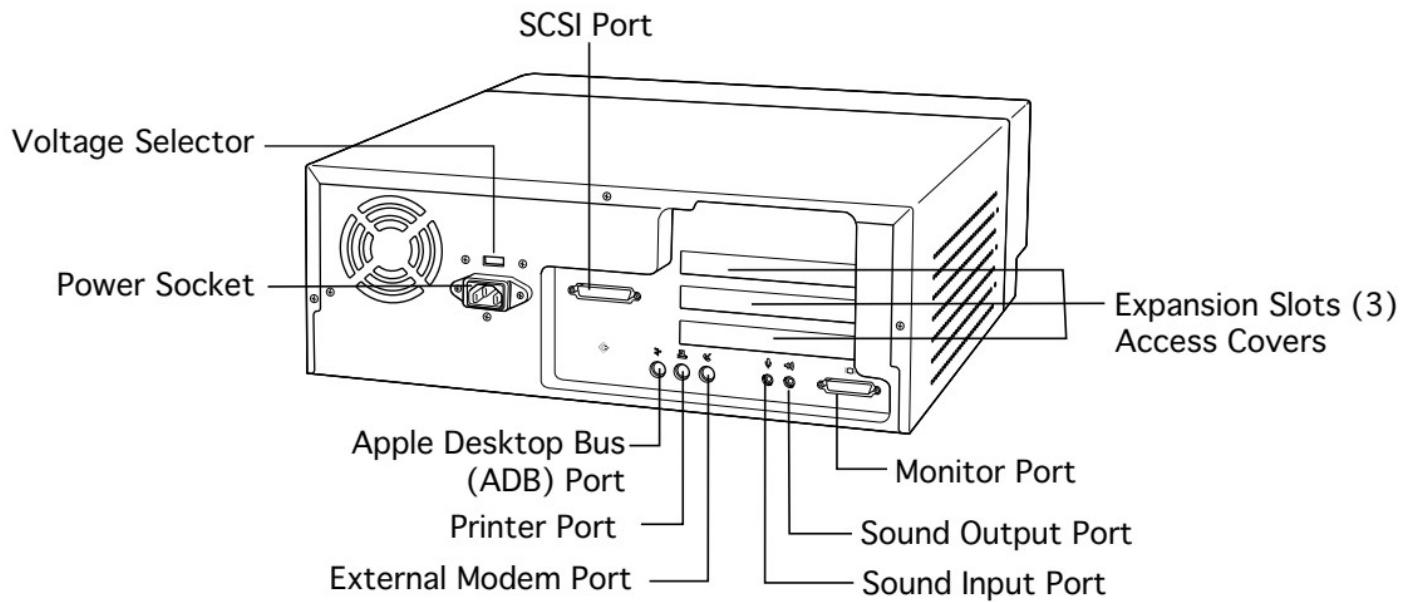


Front View



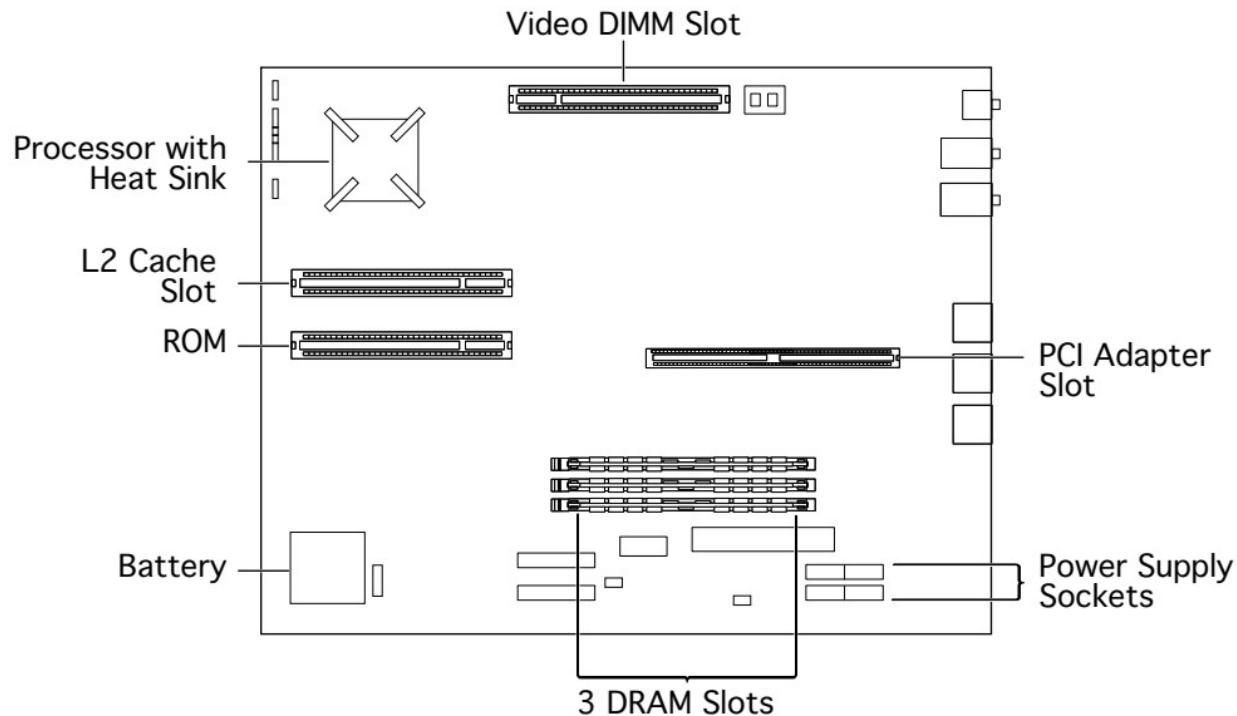


Rear View





Logic Board





Specifications
Power Macintosh 4400



Processor

CPU

PM 4400/160	PowerPC 603e processor 160 MHz Built-in floating point unit (FPU)
PM 4400/200, PM 7220/200	PowerPC 603e processor 200 MHz Built-in floating point unit (FPU)
PM 4400/200 PC, PM 7220/200 PC	PowerPC 603e processor 200 MHz Built-in floating point unit (FPU) 166 performance-rated 6x86 processor



**Processor Bus**

64-bit ROM data bus width
40 MHz system bus



Memory

DRAM

4400/160

16 MB DRAM (no RAM soldered on board)

Expandable to 96 MB in three slots using dual in-line memory modules (DIMMs) that are 64-bit wide, 168-pin unbuffered 3.3 V EDO, with 60 ns RAM access time or faster.

4400/200, 7220/200

32 MB DRAM

Expandable to 160 MB in three slots using dual in-line memory modules (DIMMs) that are 64-bit wide, 168-pin unbuffered 3.3 V EDO, with 60 ns RAM access time or faster, 1K or 2K refresh rate.



**Video RAM**

1 MB video EDO RAM DIMM
Expandable to 4 MB with SGRAM DIMM
 EDO DIMM 1 or 2 MB
 SGRAM DIMM 1, 2, or 4 MB

ROM

4 MB of read-only memory

PRAM

8K of nonvolatile parameter memory

Cache Memory

4400/160 Optional 256K Level 2 cache on a 160-pin DIMM card

4400/200, 7220/200 Optional 256K Level 2 cache DIMM



Disk Storage

Floppy Drive

1.4 MB Apple SuperDrive

Accepts high-density 1.4 MB disks and 800K disks

Reads, writes, and formats Macintosh, Windows, MS-DOS, OS/2, and ProDOS disks

CD-ROM Drive

Advanced Technology Adapter Peripheral Interface (ATAPI)
CD-ROM (8X-speed)

Hard Drive

4400/160

1.2 GB IDE hard drive

4400/200, 7220/200

2 GB IDE hard drive



I/O Interfaces

Apple Desktop Bus

One Apple Desktop Bus (ADB) port supporting up to three ADB input devices daisy-chained through a synchronous serial bus

Keyboard

Supports all Apple Desktop Bus (ADB) keyboards

Mouse

Supports all models of the ADB mouse

DMA I/O

10 DMA channels

Communications

Expansion Slot

(4400/200, 7220/200)

An Ethernet card or internal modem card may be installed in the bottom communications slot of the adapter card.





PCI Expansion

4400/160

Three industry-standard PCI expansion slots (45 watts combined power allowance for all three slots). Install only expansion cards that come with Macintosh drivers and are compliant with the PCI 2.0 standard. NuBus cards cannot be used in these expansion slots.

One internal expansion slot supports a full-size 12.28-inch 15-watt peripheral component interconnect expansion card.

All three internal expansion slots support 6.88-inch PCI expansion cards.

4400/200, 7220/200

Two industry-standard PCI expansion slots. Install only expansion cards that come with Macintosh drivers and are compliant with the PCI 2.0 standard. NuBus cards cannot be used in these expansion slots. One internal PCI expansion slot supports a 12.28-inch, 15-watt PCI card. Both internal PCI expansion slots support 6.88-inch PCI cards.



**Video-out**

Monitor port (15-pin SVGA compatible) supporting color and grayscale monitors of various sizes and resolutions. Depending on the amount of video RAM installed, the built-in video supports up to 800 x 600 pixel resolution at 16 bits per pixel and up to 1152 x 870 at 8 bits per pixel. Built-in 2D graphics acceleration.

Can connect to these monitors: Apple High Resolution RGB Monitor (13"), Macintosh Color Display (14"), Apple Basic Color Monitor (14"), Apple Color Plus 14" Display, Apple Multiple Scan 14 or Apple Multiple Scan 15 Displays, Apple 16" Display, Apple Multiple Scan 17 Display or Apple Multiple Scan 1705 Display, AppleVision 1710 Display, Apple 19" RGB Display, Apple Multiple Scan 20 Display, Apple 21" Color (two-page display).



**Sound**

16-bit stereo audio input and output—stereo in, stereo record, stereo out. Up to 44.1 KHz sampling rate.

Sound Output

One 3.5-mm sound output port for line-level devices such as powered loudspeakers.

Sound Input

One 3.5-mm sound input port for stereo sound input. The sound input port supports the Apple PlainTalk Microphone. In addition, the sound input port supports a standard stereo (miniplug-to-RCA) cable adapter for connecting stereo equipment to the computer. The port does not support the Apple Omni microphone (the round microphone shipped with some earlier models of Macintosh) or the attenuated RCA adapter provided with some models of Macintosh.



**SCSI**

One external standard SCSI port that supports up to seven external SCSI devices

Important: Some older SCSI devices or SCSI devices not manufactured by Apple may require updated drivers. Contact the device manufacturer for information on obtaining driver software.

Serial

Two high-speed DMA RS-232/RS-422 serial ports. LocalTalk and GeoPort compatible.

GeoPort Telephony

Requires GeoPort telecom adapter
28.8 Kbit/sec. modem support
V.17 fax support
GeoPort Fax and GeoPort Telephony software included
Speakerphone and answering-machine capability



Electrical

Line Voltage	90–270 VAC Switchable 110/220 VAC, RMS single phase
Frequency	47–63 Hz Single phase
Power	200 W maximum, not including display
Energy Star	EPA Energy Star compliant





Physical

Dimensions

Height: 5.43" (139 mm)

Width: 15.12" (385 mm)

Depth: 17.37" (442 mm)

Weight

24 lb. (9.5 kg)

Weight varies depending on type of hard disk and any optional equipment.



Environmental

Temperature

Operating: 50°–104° F (10°–40° C)

Storage: -40° to 116.6° F (-40° to 47° C)

Transient: -40° to 149° F (-40° to 65° C)

Humidity

Noncondensing, 20–95%

Altitude

0–10,000 ft. (0–3,048 m)





Troubleshooting

Power Macintosh 4400



General

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to your product. Because cures are listed on the charts in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure. (Note: If you have replaced a module, reinstall the original module before you proceed to the next cure.)

If you are not sure what the problem is, or if the Symptom Charts do not resolve the problem, refer to the Flowchart for the product family.

For additional assistance, contact Apple Technical Support.



Symptom Charts

System

System
intermittently
crashes or hangs

- 1 Verify that system software is version 7.5.3 or later.
- 2 Verify that software is known-good.
- 3 Verify that software is PowerPC-compatible (contact developer).
- 4 Clear parameter RAM. Hold down Command-Option-P-R during startup, but before "Welcome to Macintosh" appears.
- 5 Disconnect all external devices attached (except monitor) and restart.
- 6 Replace DIMMs.
- 7 Replace logic board. Retain customer's DIMMs.
- 8 Replace power supply.





System

System does not start up

- 1 Reset logic board. Refer to Additional Procedures.
- 2 Replace power supply.
- 3 Replace logic board. Retain customer's DIMMs.

System does not start up from keyboard, but starts up from power switch

- 1 Check keyboard connection.
- 2 Verify keyboard as known-good.

System does not start up from power switch, but starts up from keyboard

- 1 Make sure power switch cable is properly plugged into logic board.
- 2 Check for cuts in power switch cable (especially near front under CD-ROM drive).





System

Front power switch

LED does not light up

- 1 Check LED connection to logic board.
- 2 Check polarity of LED connector on logic board. Triangle should be over pin 1.
- 3 Check cable for cuts (especially under CD-ROM drive).
- 4 Replace LED harness.



Audio

Distorted or garbled sound

- 1 Check volume level.
- 2 Check volume level in Monitor and Sound control panel.
- 3 Check speaker for damage.

No sound output from speaker

- 1 Check speaker connection to logic board.
- 2 Attach headphones. If you hear sound through headphones, replace speaker assembly.
- 3 Replace speaker assembly.



Video

No video, fan is running

- 1 Check monitor connection.
- 2 Try known-good monitor.
- 3 Remove all DRAM DIMMs and try replacing them one at a time to test. Replace any bad DIMMs.
- 4 Replace logic board. Retain customer's DIMMs.
- 5 Replace power supply.

After restarting, two connected monitors, used for video mirroring, appear black or gray

Note: This issue only affects early European Power Macintosh 4400 systems.

Unplug monitor cable connected to PCI video card and restart.

Or, if user wants to continue video mirroring, instruct to turn off video mirroring in Monitors & Sounds control panel before shutting down or restarting. Turn video mirroring on after starting computer.





Floppy Drive

Audio and video are present, but internal floppy drive does not operate

- 1 Replace bad disk with known-good disk.
- 2 Make sure cable is connected to logic board.
- 3 Replace floppy drive.
- 4 Replace cable connecting to the logic board.
- 5 Replace logic board. Retain customer's DIMMs.

Disk ejects; display shows icon with blinking "X"

- 1 Replace bad system disk with known-good system disk.
- 2 Replace floppy drive.
- 3 Replace logic board. Retain customer's DIMMs.

Disk does not insert all the way

- 1 Eject previously inserted disk by inserting opened paper clip into hole beside floppy drive.
- 2 Switch off system and hold mouse button down while switching system on (to complete eject cycle).
- 3 Replace floppy drive.





Floppy Drive

Disk does not eject

- 1 Insert opened paper clip into hole beside floppy drive.
- 2 Switch off system and hold mouse button down while switching system on (to complete eject cycle).
- 3 Replace floppy drive.

Internal floppy drive
runs continuously

- 1 Replace bad disk with known-good disk.
- 2 Replace floppy drive.
- 3 Replace logic board. Retain customer's DIMMs.



Hard Drive

Internal or external hard drive does not spin up

- 1 Verify that all hard drive connections are secure.
- 2 Reseat logic board.
- 3 Replace internal IDE hard drive.
- 4 Replace logic board. Retain customer's DIMMs.

Internal hard drive runs continuously

- 1 Verify that system software is version 7.5.3 or later.
- 2 Replace hard drive cable.
- 3 Replace internal hard drive.
- 4 Replace logic board. Retain customer's DIMMs.

Hard drive not found when booted from CD-ROM drive

Use Drive Setup to attempt to recognize or mount hard drive.





Hard Drive

Hard drive not
recognized

- 1 Make sure CD-ROM interface cable is connected.
Note: This IDE bus termination issue only affects early European Power Macintosh 4400 systems.
- 2 Make sure hard drive cables are securely connected.



CD-ROM Drive

CD-ROM drive does
not accept disc

- 1 If compact disc is dirty or damaged, use known-good compact disc.
- 2 Replace CD-ROM drive.

Volume control does
not operate correctly
when playing audio
CD, but does work
when playing system
sounds

Check Monitor and Sound control panel setting.

Computer cannot
mount known-good
CD-ROM discs

- 1 Check that CD-ROM drive software is installed correctly.
- 2 Check power and signal cable connections.
- 3 Replace CD-ROM drive.



Peripheral

Cursor does not move

- 1 Restart system.
- 2 Check mouse connection.
- 3 If mouse was connected to keyboard, connect mouse to rear ADB port and disconnect keyboard. If mouse works, replace keyboard.
- 4 If mouse does not work in ADB port, replace mouse.
- 5 Reseat logic board.
- 6 Replace logic board. Retain customer's DIMMs.

Cursor moves, but
when you click the
mouse, nothing
happens

- 1 Replace mouse.
- 2 Reseat logic board.
- 3 Replace logic board. Retain customer's DIMMs.





Peripheral

Cannot double-click mouse to open application, disk, or server

- 1 Check mouse speed on Mouse control panel.
- 2 Unplug battery from logic board, wait 20 seconds, plug in battery, and restart computer.
- 3 If mouse was connected to keyboard, connect mouse to rear ADB port and disconnect keyboard. If mouse works, replace keyboard.
- 4 If mouse does not work in ADB port, replace mouse.
- 5 Replace logic board. Retain customer's DIMMs.

No response to any key on keyboard

- 1 Verify that system software is version 7.5.3 or later.
- 2 Check keyboard connection to ADB port.
- 3 Replace keyboard.
- 4 Reseat logic board.
- 5 Replace logic board. Retain customer's DIMMs.





Peripheral

Known-good
StyleWriter does not
print

- 1 Verify that Chooser is set correctly.
- 2 Verify that printer driver and system software are not corrupt.
- 3 Verify system software is version 7.5.3 or later.
- 4 Replace printer interface cable.
- 5 Replace logic board. Retain customer's DIMMs.

Known-good
LaserWriter does not
print

- 1 Verify that Chooser is set correctly.
- 2 Verify that printer driver and system software are not corrupt.
- 3 Verify system is properly connected to printer.



Miscellaneous

No audio, and no drive operation

- 1 Connect power cable.
- 2 Switch power on.
- 3 Replace power cable.
- 4 Replace logic board. Retain customer's DIMMs.

“Sad Macintosh” icon

- 1 Start up from known-good disk.
- 2 Replace DIMMs.
- 3 Replace logic board. Retain customer's DIMMs.





Miscellaneous

Screen shows “Sad Macintosh” icon and black vertical lines; screeching sound

- 1 Replace DIMMs.
- 2 Replace logic board. Retain customer’s DIMMs.

Headphone jack does not operate correctly

Verify that headphone jack is seated properly.



Take Apart
Power Macintosh 4400



Top Housing

Top Housing



No preliminary steps are required before you begin this procedure.

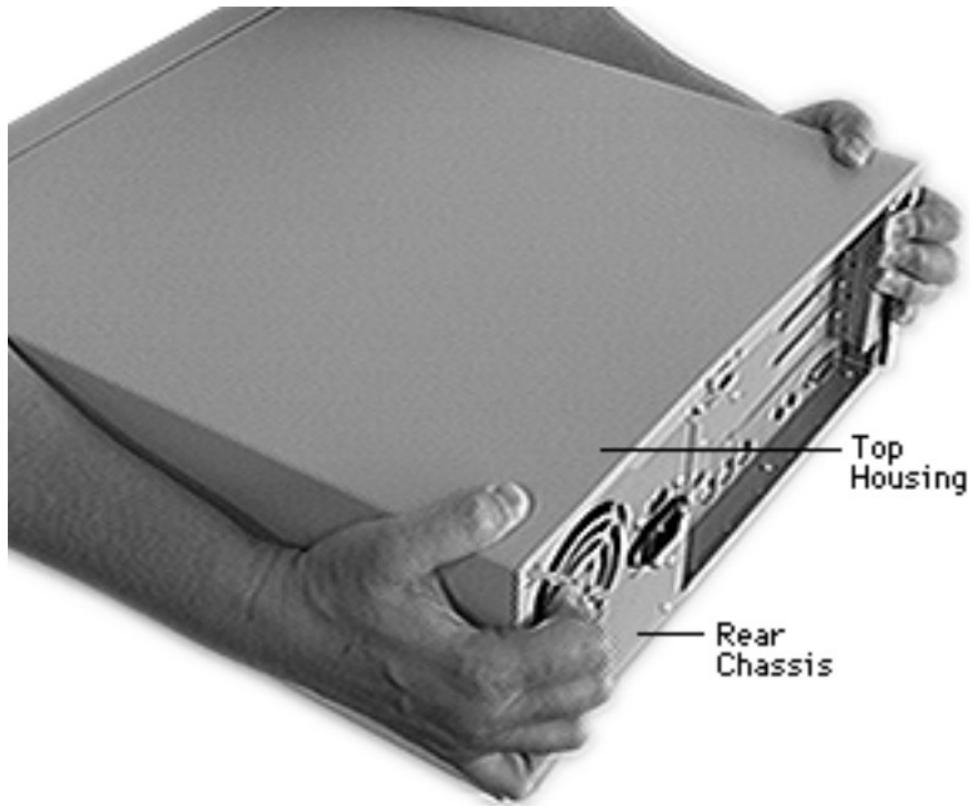
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Remove the screws that secure the housing to the rear of the chassis.





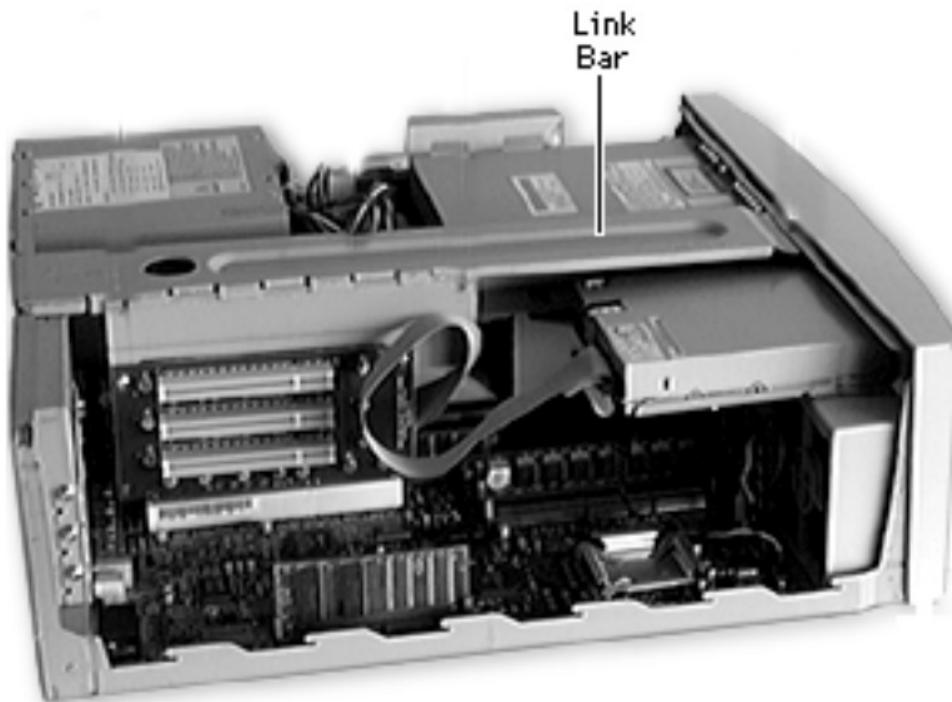
- 2 Firmly grasp both sides of the top housing at the back of the unit. Wrap your fingers around to the back of the unit. Push on the rear chassis to slide the housing back about 10 mm.
- 3 Lift the top housing and remove it from the computer.

Replacement Note: Place the top housing on the computer, aligning the sides with the chassis rails. Position the top housing about 10 mm from the front





panel. Slide the top housing forward until it fits into place. If the lid doesn't fit properly, check the link bar to be sure it is installed correctly. Also, if the floppy/CD-ROM drive carrier was removed, make sure the carrier hooks correctly into the bottom of the chassis. Replace the rear screws.



Link Bar

Before you begin, remove the top housing.

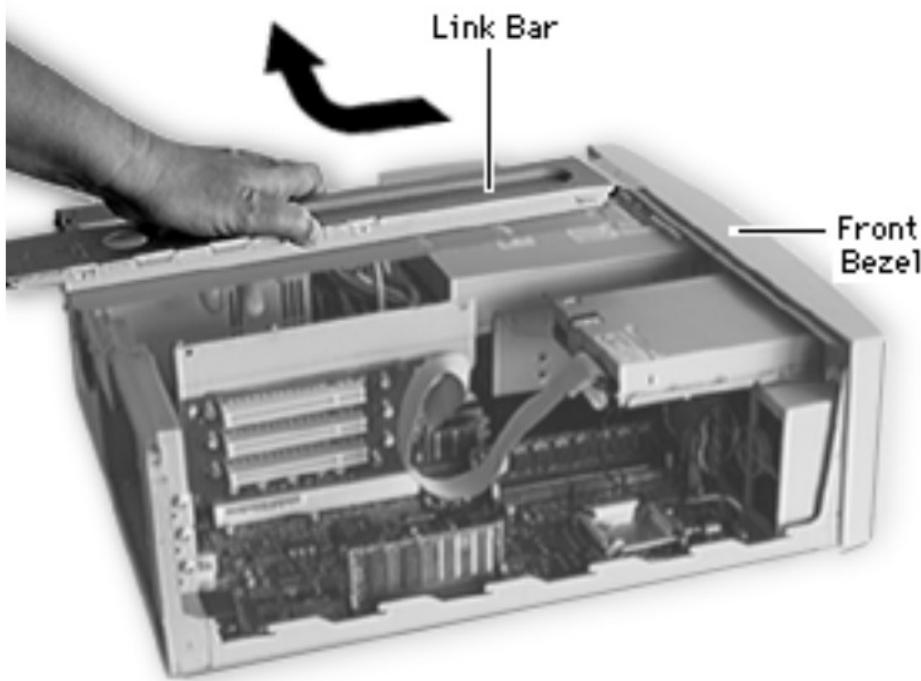
Caution: Review the ESD precautions in Bulletins/Safety.





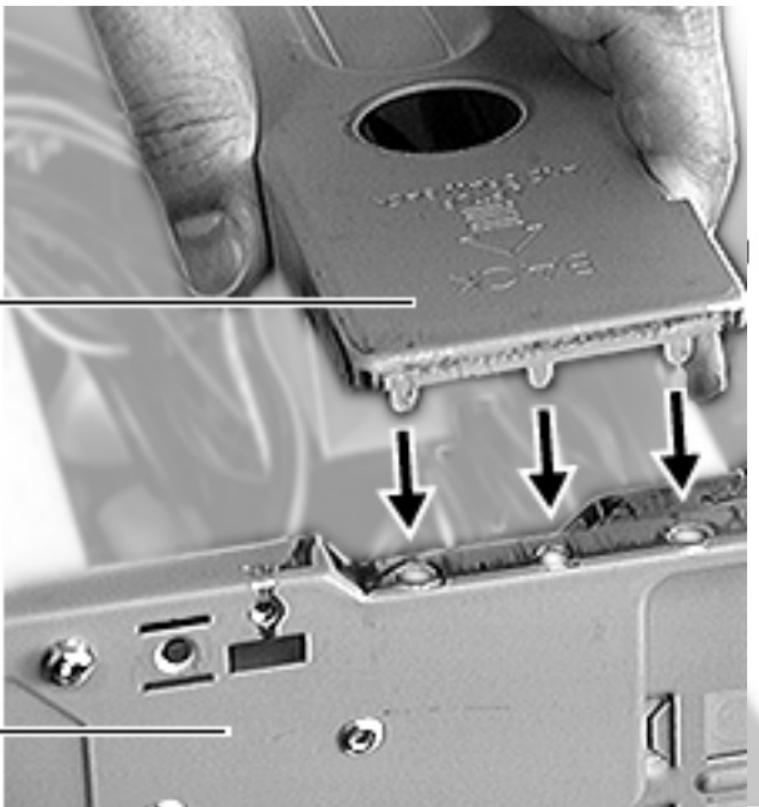
- 1 Detach the pegs of the link bar from the slots in the rear of the computer.





- 2 Slide the link bar back about half an inch and lift the link bar out.





Replacement Note: To replace the link bar, position the bar so that it firmly holds the PCI adapter board and disk drive carriers. Slide the link bar toward the front panel until it fits into place. The three hooks at the bottom of the link bar must catch the floppy/CD-ROM drive carrier. If it doesn't fit correctly after the floppy/CD-ROM drive carrier was removed, make sure the carrier was installed correctly.

Press the rear of the bar to

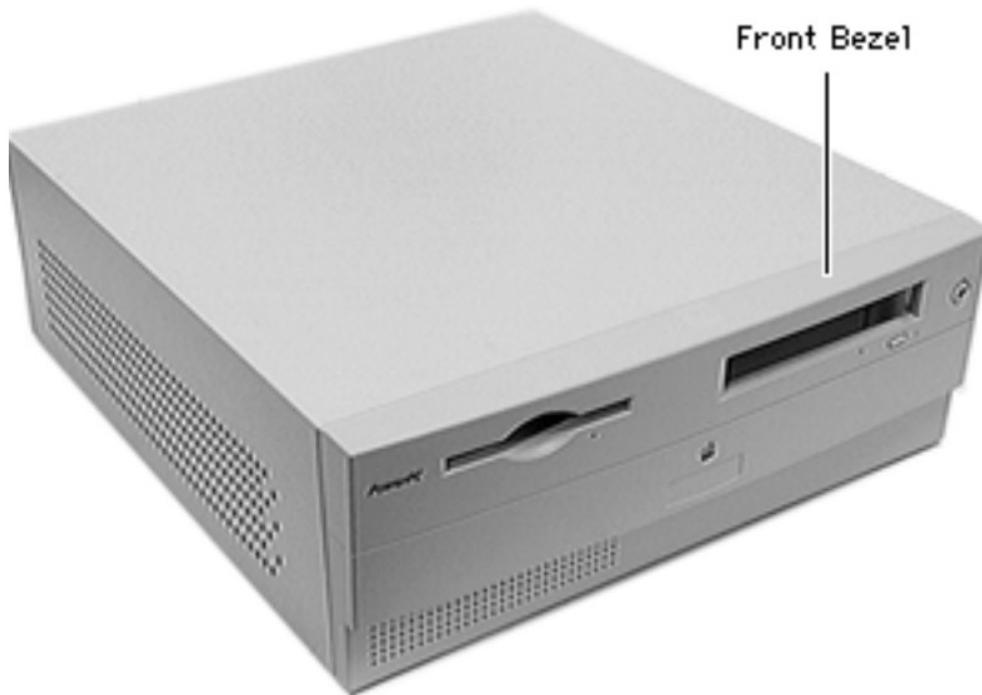




lock the pegs into the slots
in the rear of the chassis.



Front Bezel

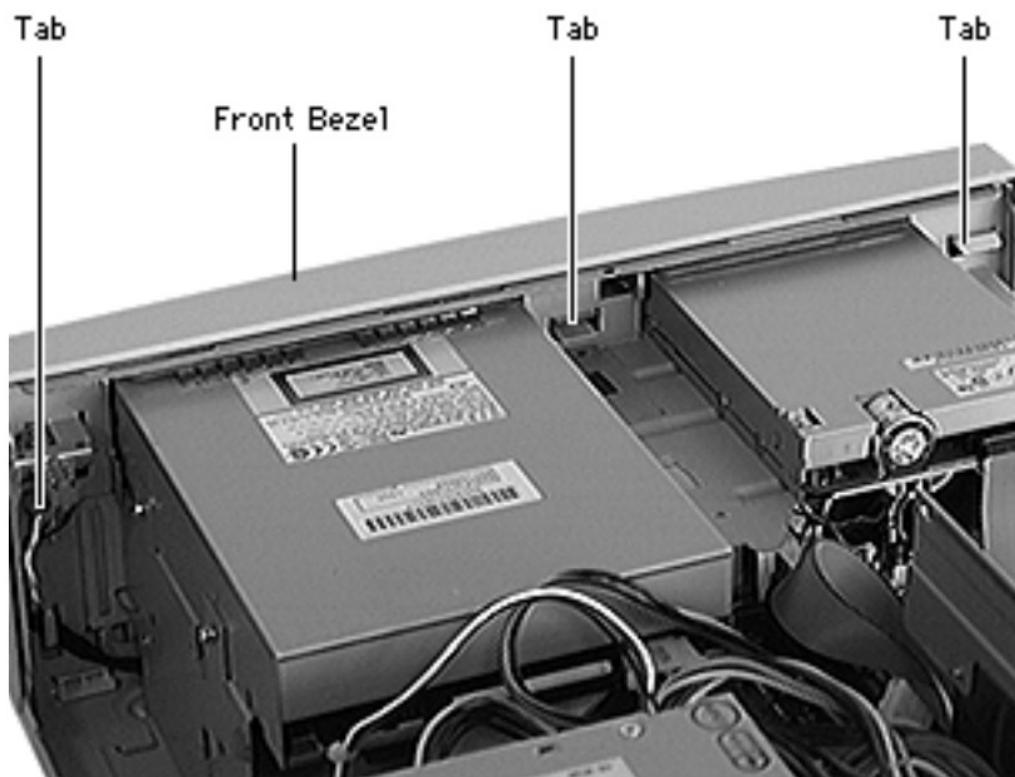


Before you begin, remove the following:

- Top housing
- Link bar

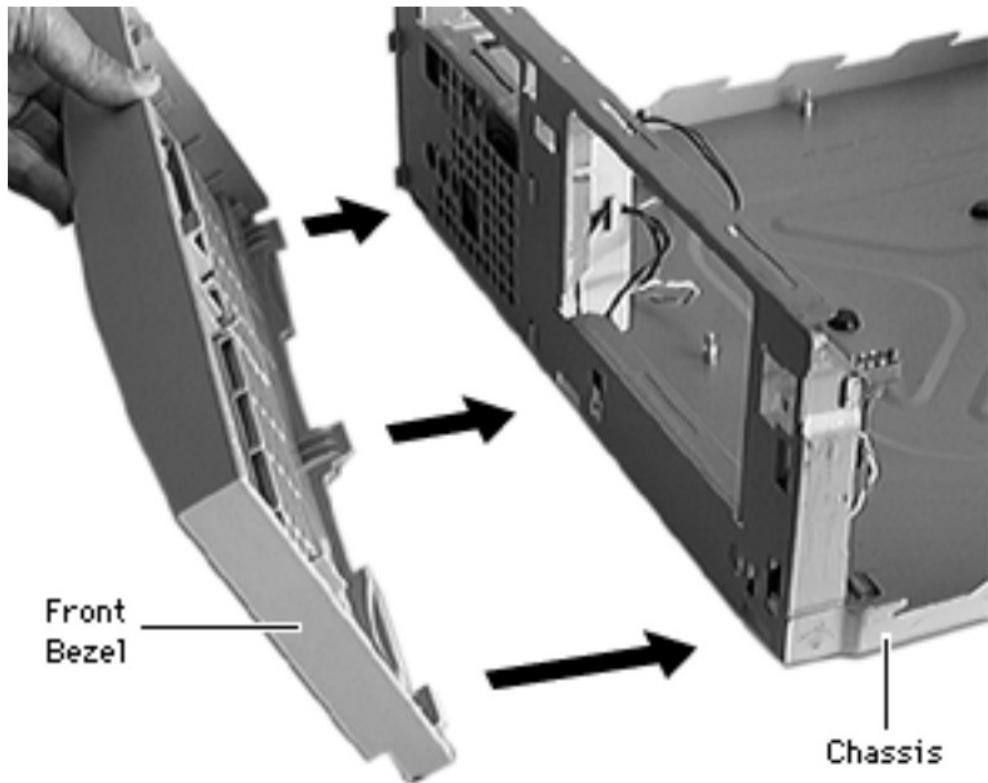
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Press the three front bezel release tabs inside the chassis.
- 2 Remove the bezel from the chassis.

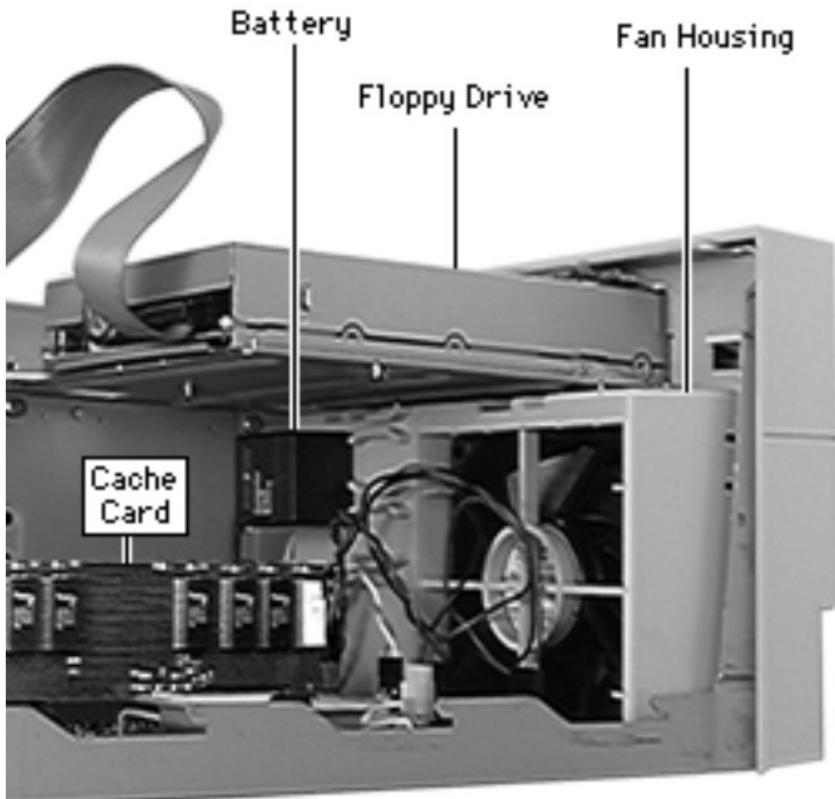




Replacement Note: Insert the three tabs at the front base of the chassis. Snap the release tabs into place.



Cache Card



Before you begin, remove the top housing.

Note: Do not touch the connectors. Handle only by the edges.





PCI Adapter Card

Before you begin, remove the following:

- Top housing
- Link bar

Caution: Review the ESD precautions in Bulletins/Safety.

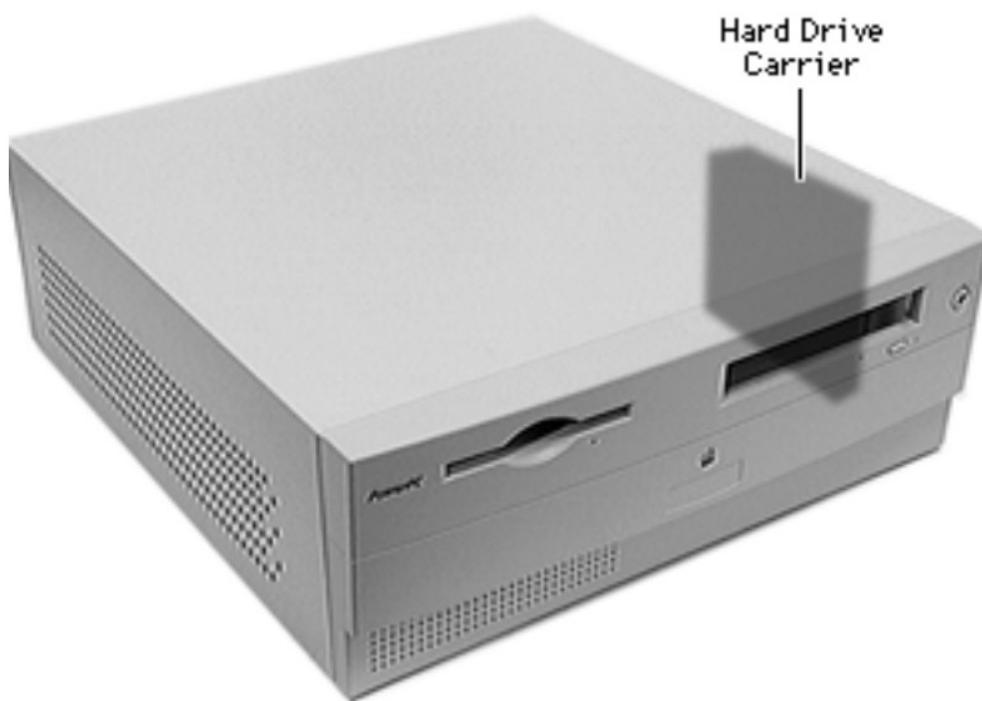
Press the connector down while pulling up on the PCI adapter card to remove it from the logic board slot.



PCI Connector



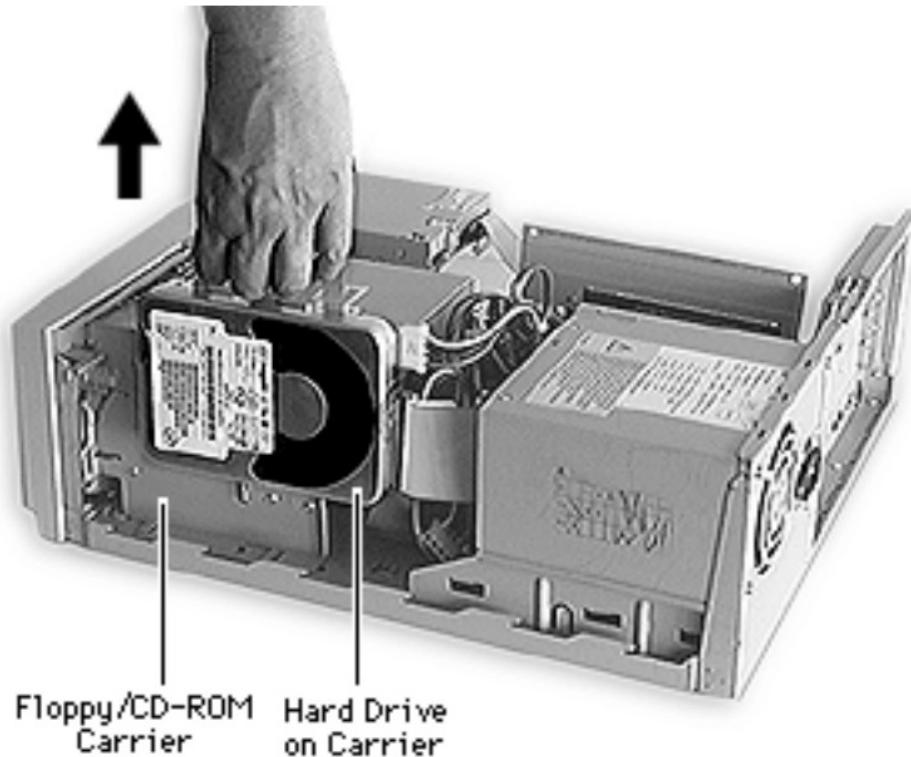
Hard Drive Carrier



Before you begin, remove the top housing.

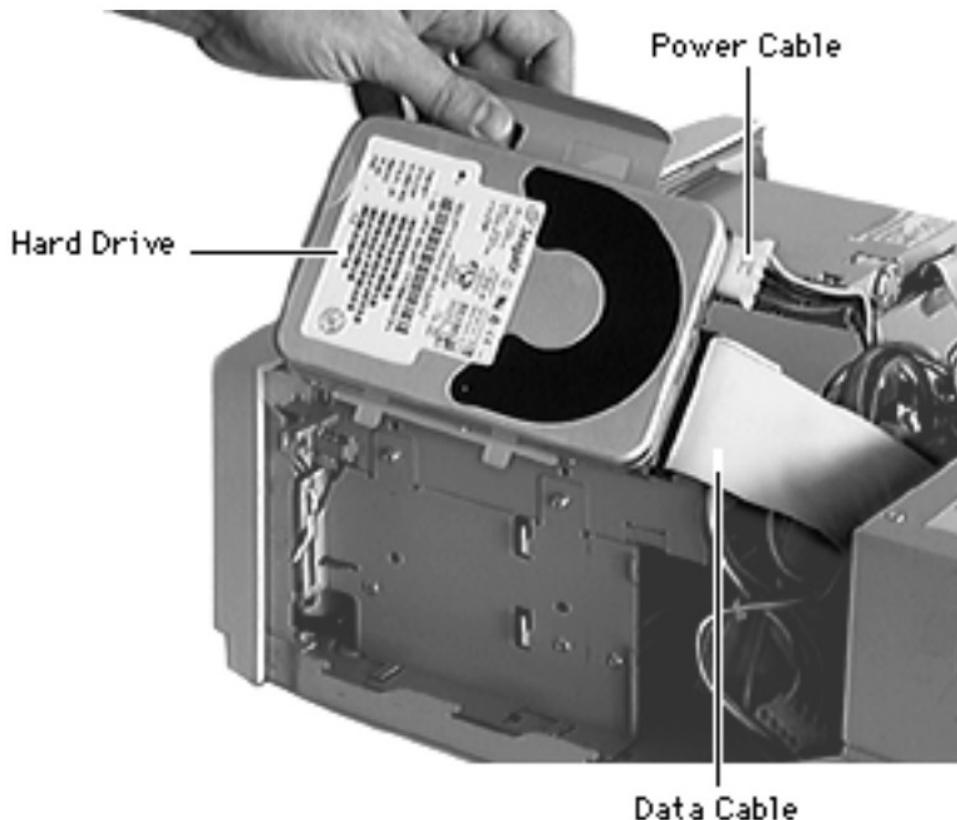
Caution: Review the ESD precautions in Bulletins/Safety.





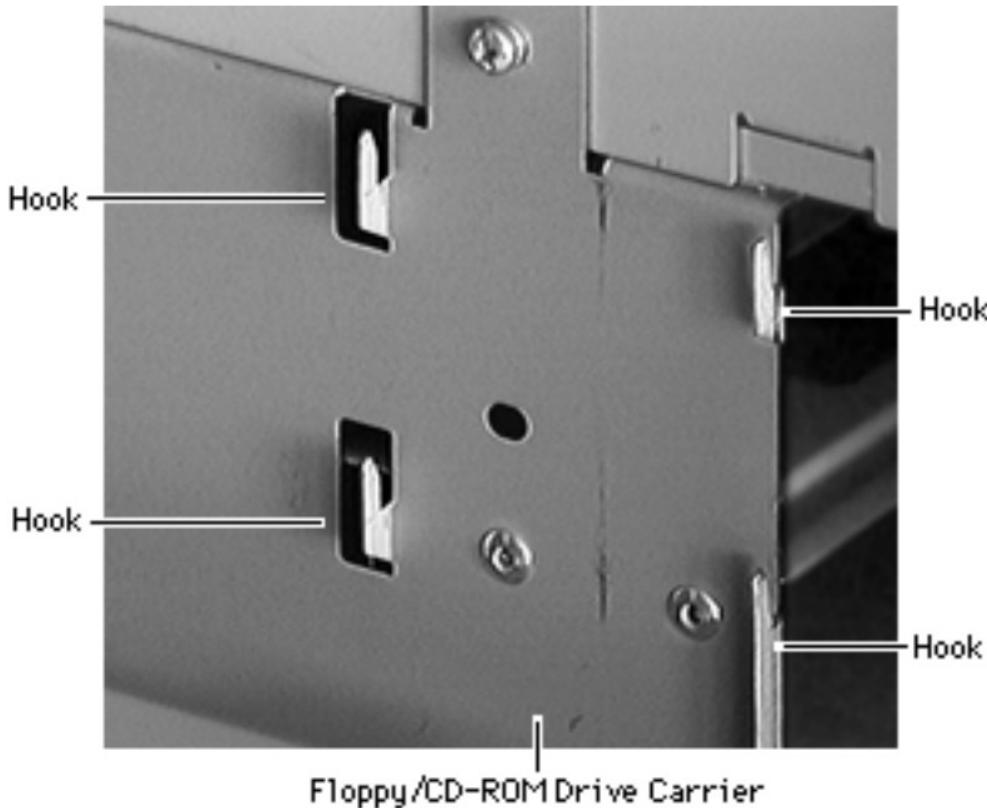
- 1 Lift up the hard drive carrier to detach it from the hooks on the floppy/CD-ROM drive carrier.





- 2 Disconnect the power and data cables attached to the hard drive.



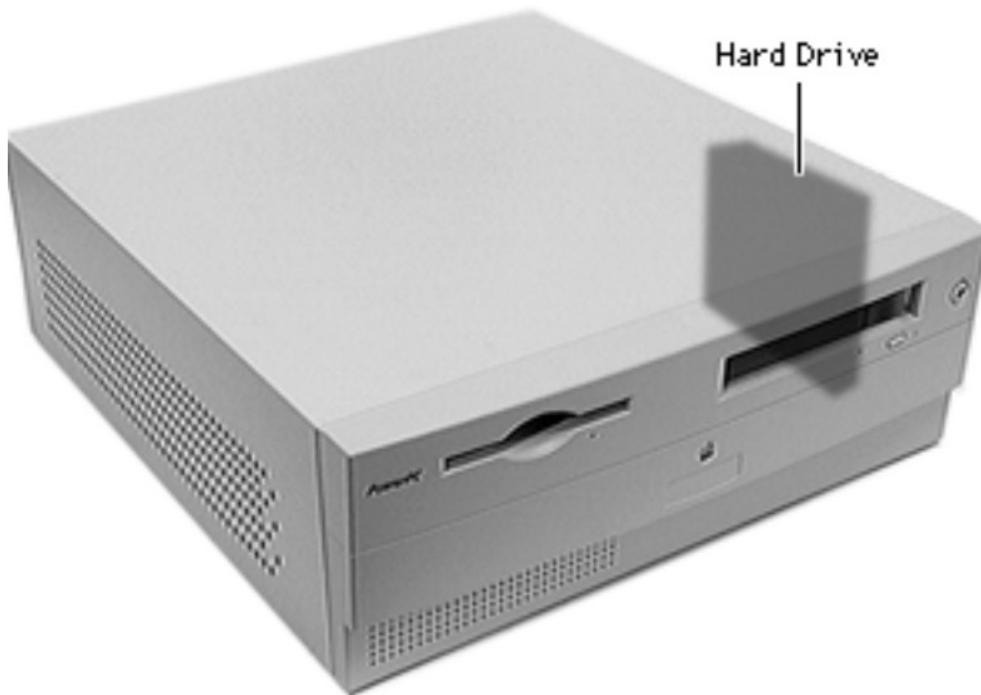


Caution: Cables can catch on the exposed hooks and become damaged.

Replacement Note: Place the hard drive carrier on the hooks that attach it to the floppy/CD-ROM drive carrier.



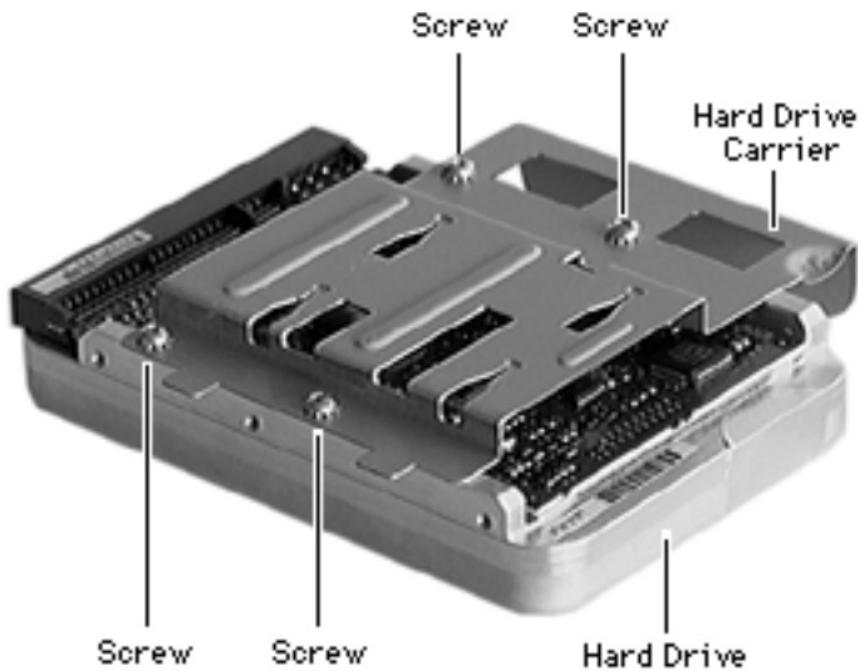
Hard Drive



Before you begin, remove the following:

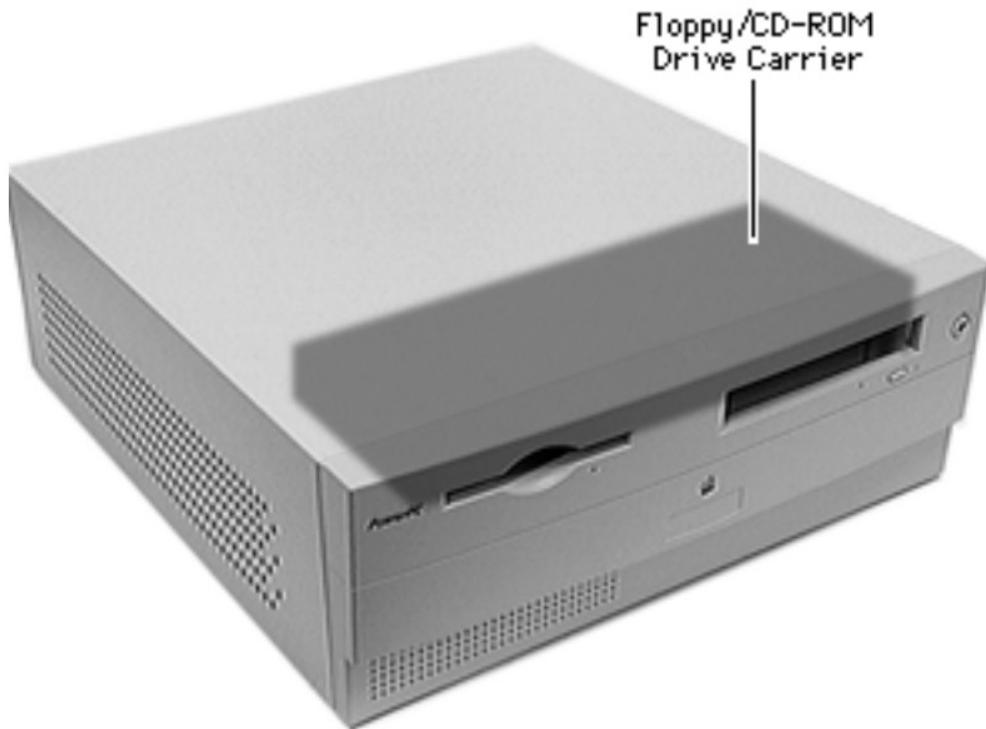
- Top housing
- Hard drive carrier

Caution: Review the ESD precautions in Bulletins/Safety.



- 1 Remove the four screws that secure the hard drive to the hard drive carrier.
- 2 Remove the hard drive from the carrier.

Replacement Note: Position the hard drive on the hard drive carrier. Replace the four screws to secure the hard drive to the carrier. Connect the hard drive cables to the hard drive. Place the hard drive carrier on the hooks that attach it to the floppy/CD-ROM drive carrier.



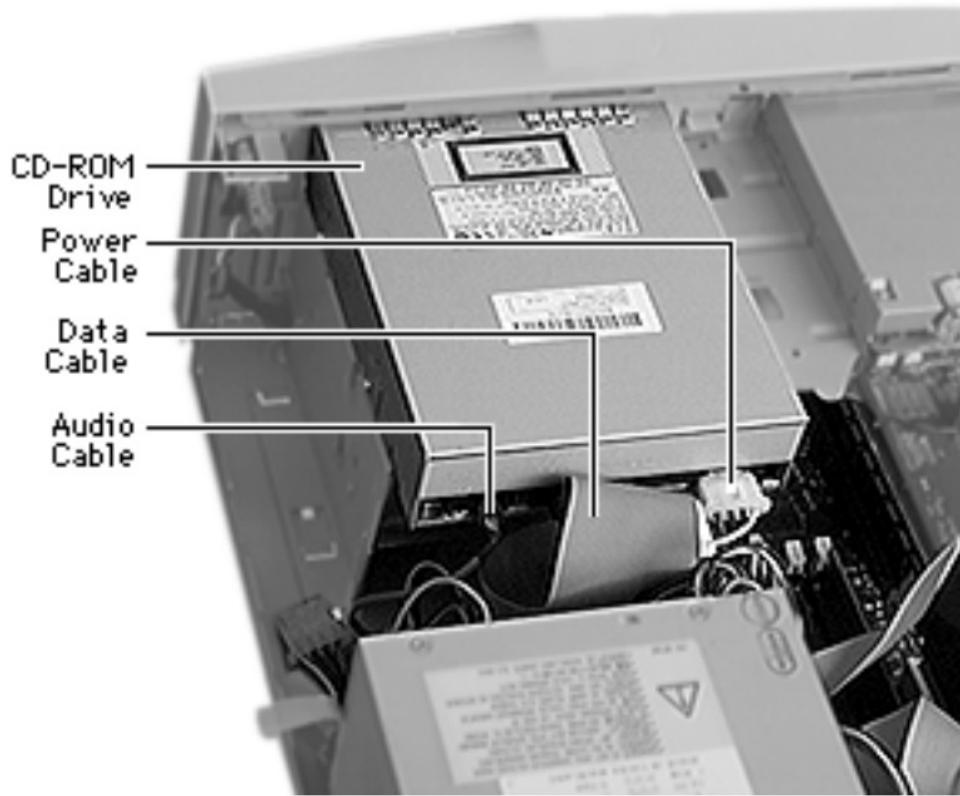
Floppy/CD-ROM Drive Carrier

Before you begin, remove the following:

- Top housing
- Link bar
- Front bezel
- Hard drive carrier
- PCI adapter card

Caution: Review the ESD precautions in Bulletins/Safety.

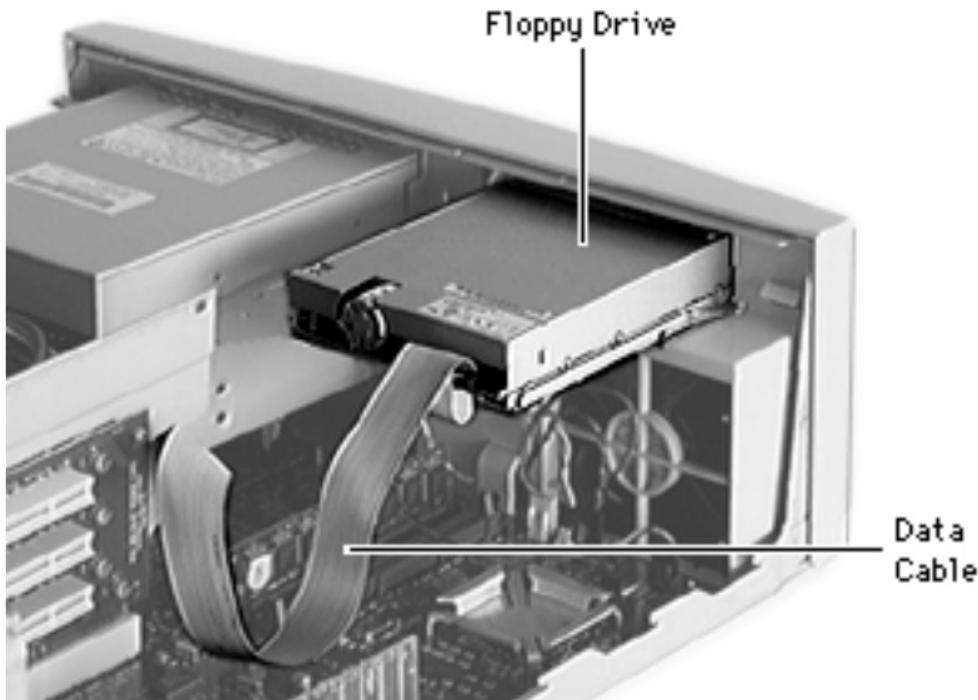




- 1 **Note:** Press the plastic release tab on the audio tab to remove it.

Disconnect the audio, data, and power cables from the CD-ROM drive.



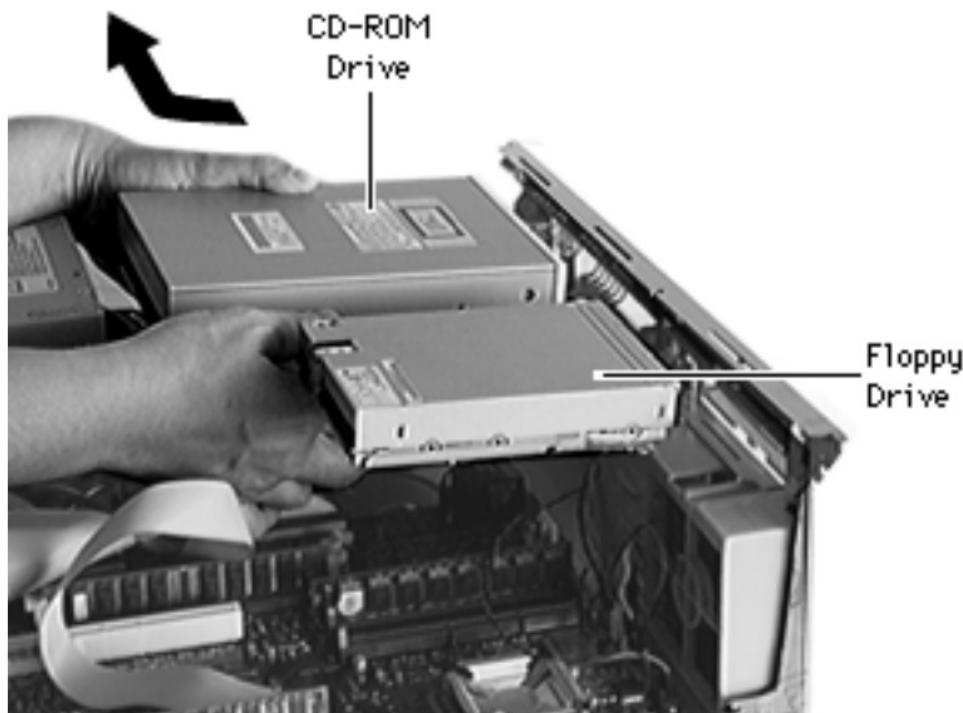


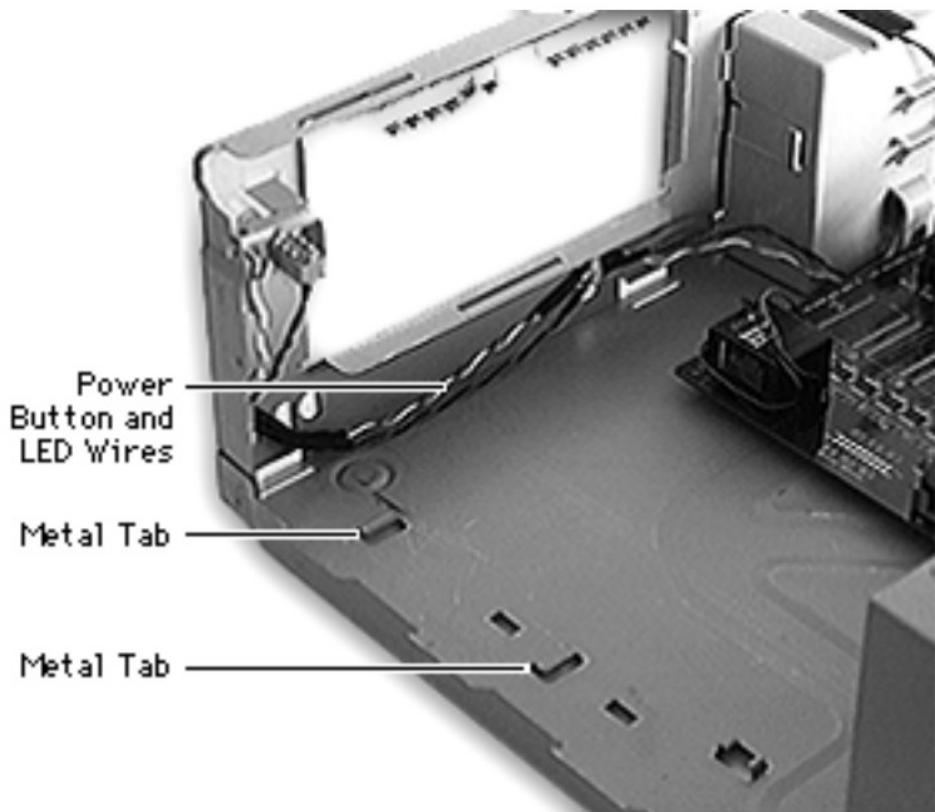
- 2 Disconnect the data cable from the floppy drive.
- 3 Pull the floppy/CD-ROM drive carrier about 1 cm away from the front panel and toward the CD-ROM drive to avoid catching the metal hook under the logic board.





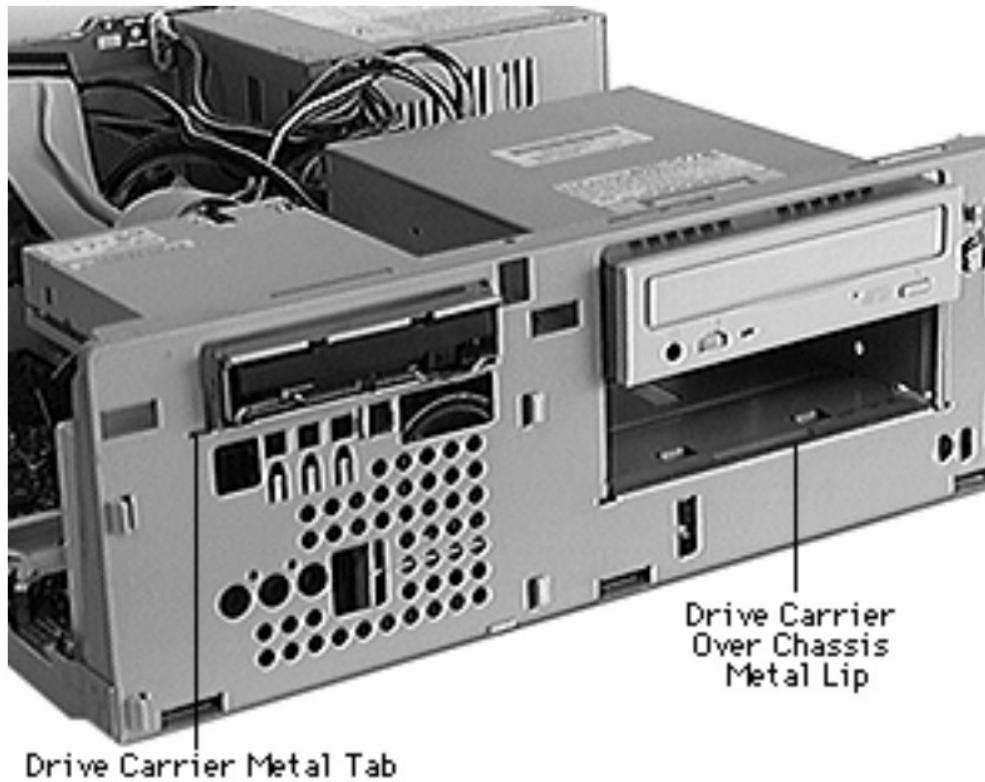
- 4 Lift the carrier out of the computer.





Replacement Note: Be sure the power button and LED wires are firmly held under the clips and clear of the floppy/CD-ROM carrier path. These wires are easily cut when the drive carrier slides across them. Also pull the power supply wires out of the way. Guide the CD-ROM drive under the metal spring tabs at the top of the opening in front of the chassis. Align the carrier with the metal tabs at the base of the chassis and slide the carrier toward the chassis front until it fits into

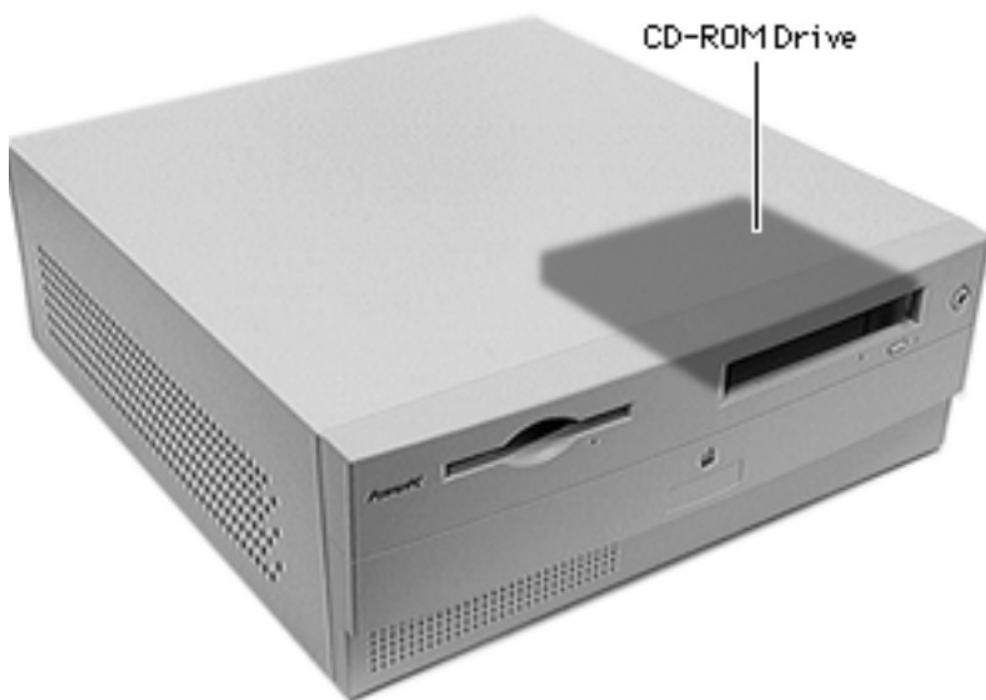




place. Look at the front of the chassis to be sure the bottom edge of the CD-ROM drive carrier isn't caught under the metal lip of the chassis CD-ROM drive opening. Be sure the drive carrier metal tab at the bottom left of the floppy drive is all the way through the slot in the chassis front opening.



CD-ROM Drive

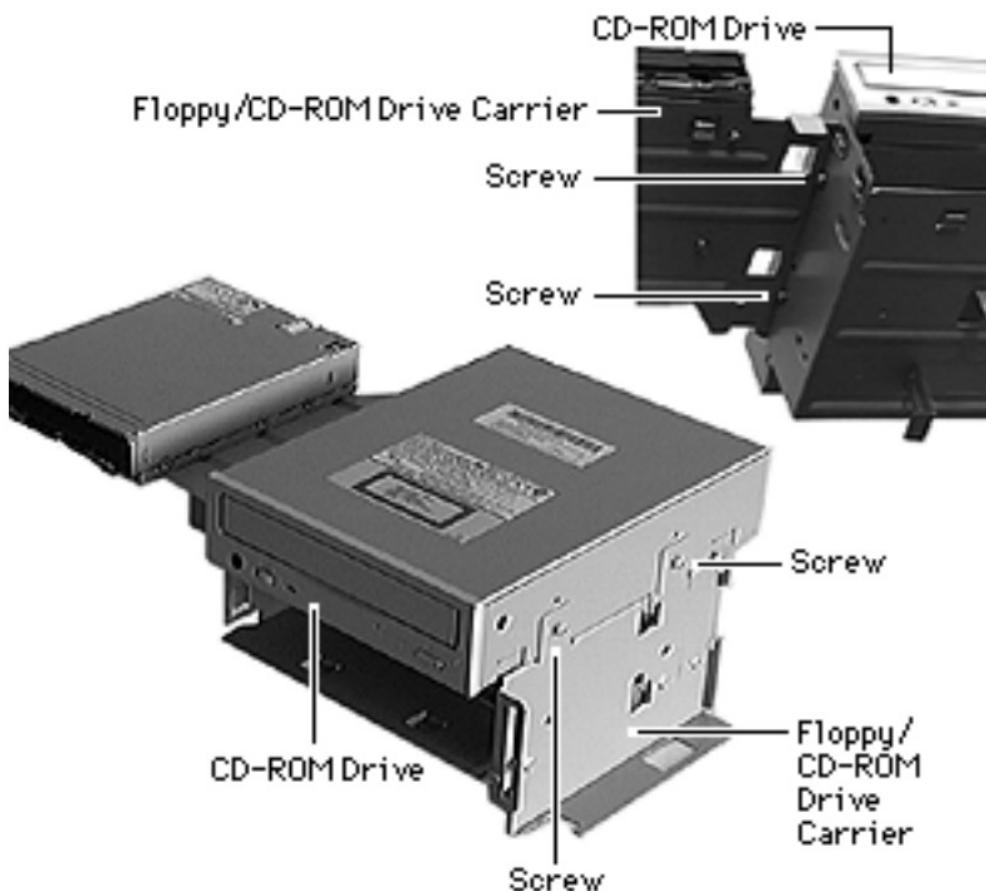


Before you begin, remove the following:

- Top housing
- Link bar
- PCI adapter card
- Front bezel
- Hard drive carrier
- Floppy/CD-ROM drive carrier

Caution: Review the ESD precautions in Bulletins/Safety.





- 1 **Note:** A long-neck Phillips screw driver will make it easier to remove the CD-ROM screws under the floppy carrier.
Remove the four screws that secure the CD-ROM drive to the floppy/CD-ROM drive carrier.
- 2 Remove the CD-ROM drive from the carrier.





Replacement Note: Position the CD-ROM drive on the drive bay. Replace the screws on both sides of the CD-ROM drive to secure it to the carrier. Replace the drive carrier in the computer, aligning the carrier with the tabs at the base of the housing. Fasten the hard drive carrier on the hooks on the side of the floppy/CD-ROM drive carrier. Connect the CD-ROM drive cables.

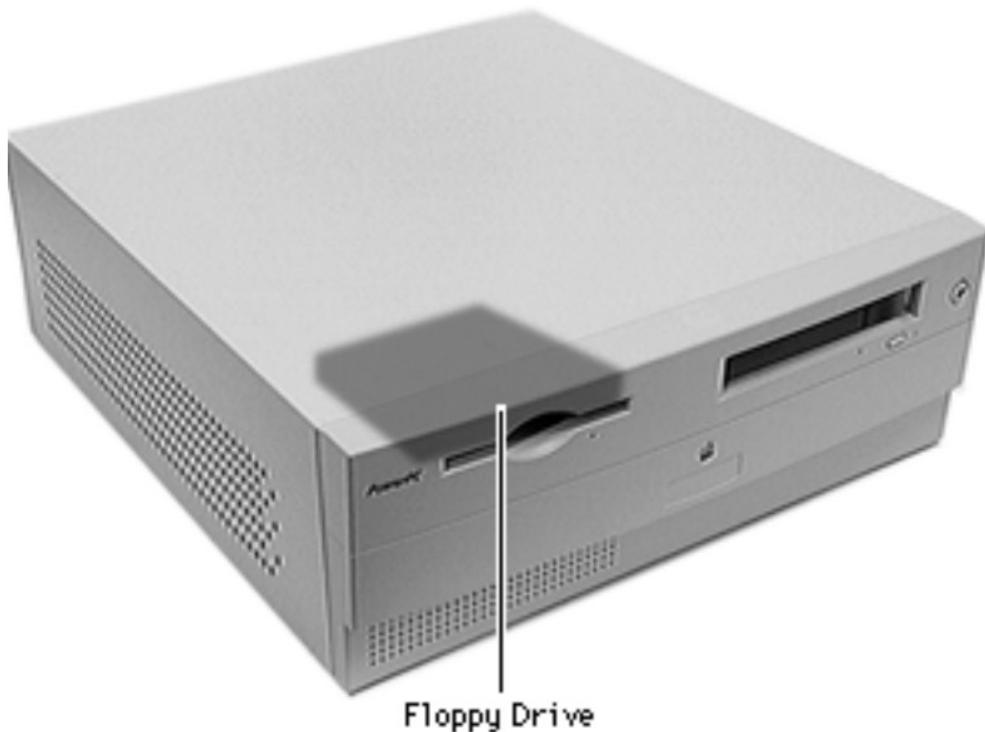


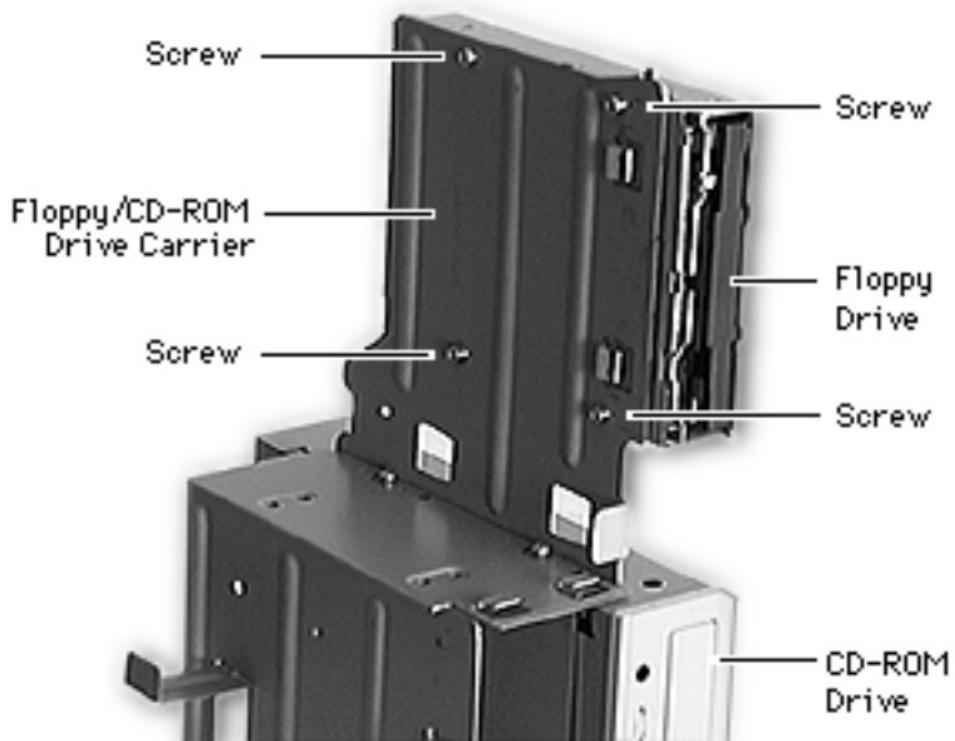
Floppy Drive

Before you begin, remove the following:

- Top housing
- Link bar
- Front bezel
- PCI adapter card
- Hard drive carrier
- Floppy/CD-ROM drive carrier

Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Remove the four screws under the floppy drive bay that secure the Apple SuperDrive to the floppy/CD-ROM drive carrier.
- 2 Remove the Apple SuperDrive from the carrier.

Replacement Note: Position the floppy drive on the bay of the carrier. Replace the four screws that secure the floppy drive to the carrier. Replace the drive carrier in the chassis aligning the carrier with the tabs at the





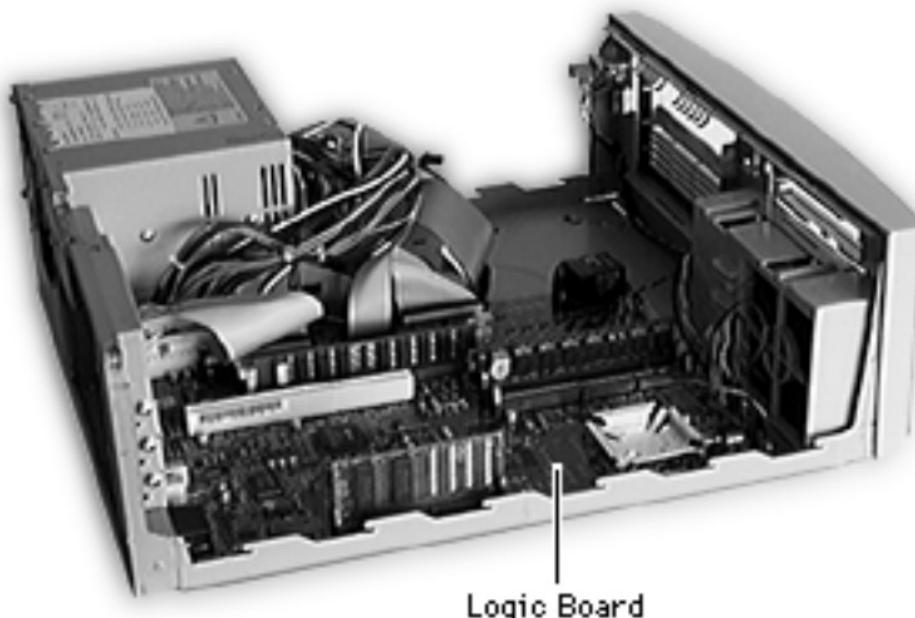
base of the housing. Fasten the hard drive carrier on the hooks on the side of the floppy/CD-ROM drive carrier. Connect the floppy drive cables.



Logic Board

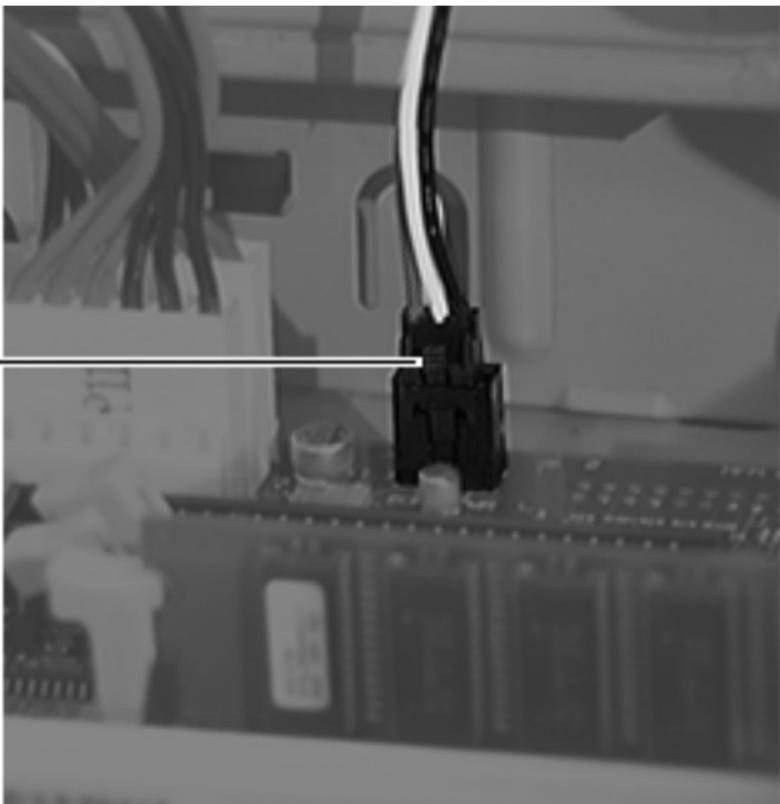
Before you begin, remove the following:

- Top housing
- Link bar
- Front bezel
- PCI adapter card
- Hard drive carrier
- Floppy/CD-ROM drive carrier



Caution: Review the ESD precautions in Bulletins/Safety.

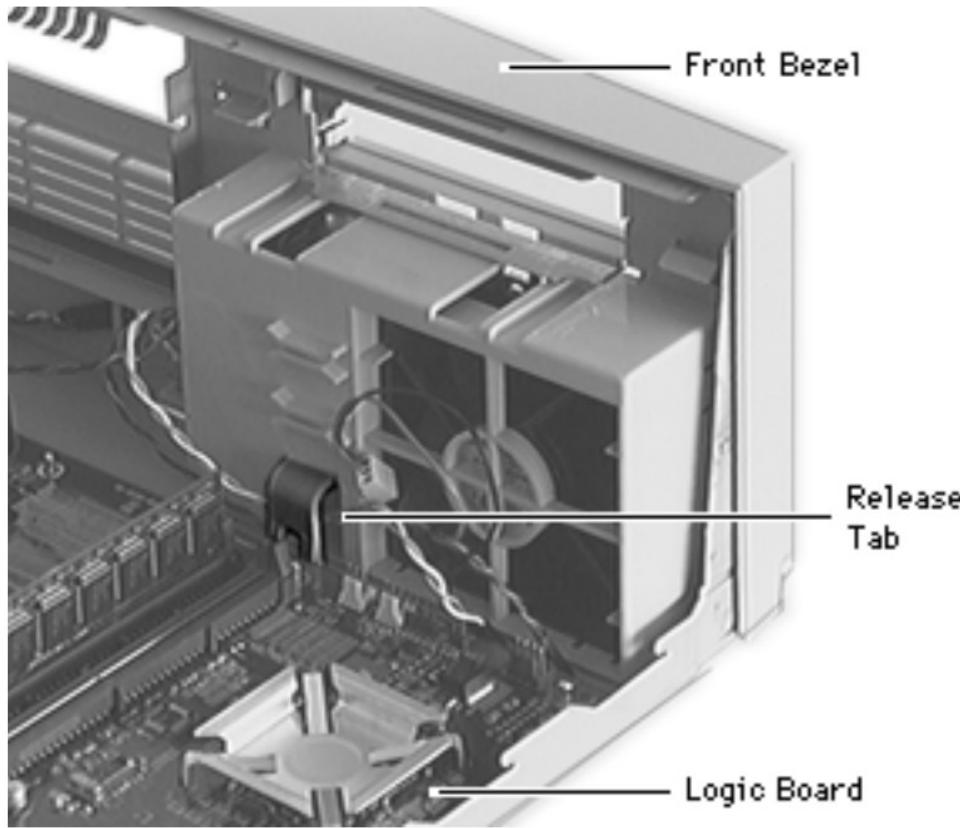




1 **Note:** Press the release tab of the soft-power connector to remove it. Grasp the plastic connector (not the wires) when removing the CD audio cable.

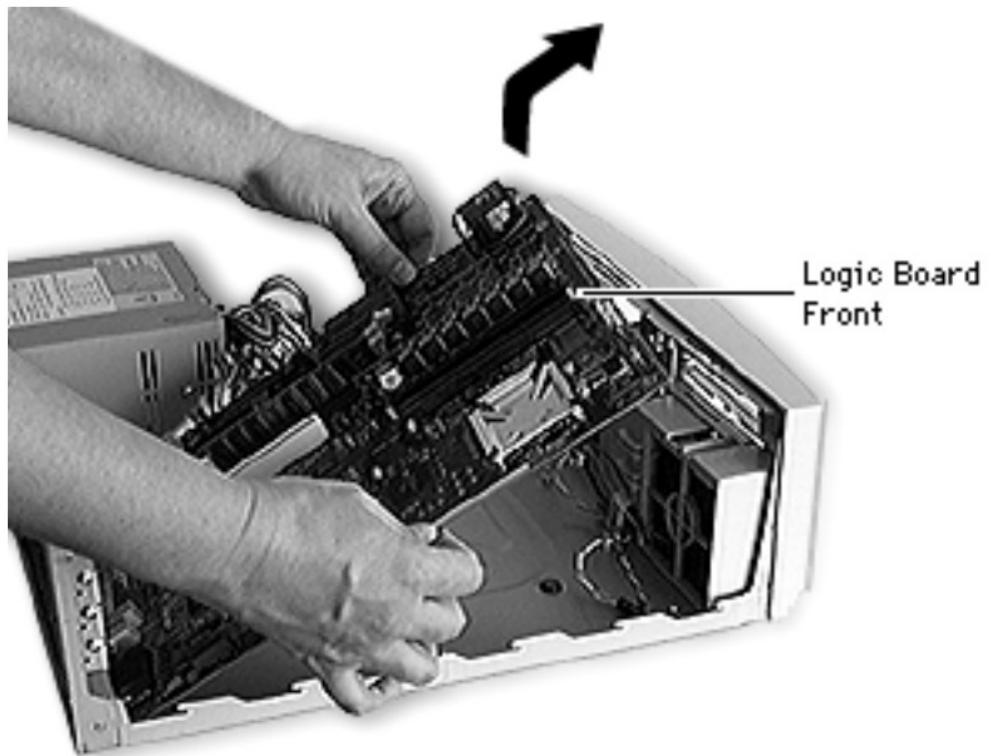
Disconnect all cables from the logic board. Refer to the logic board diagram at the end of this section.





- 2 Press the release tab near the front panel to release the logic board.

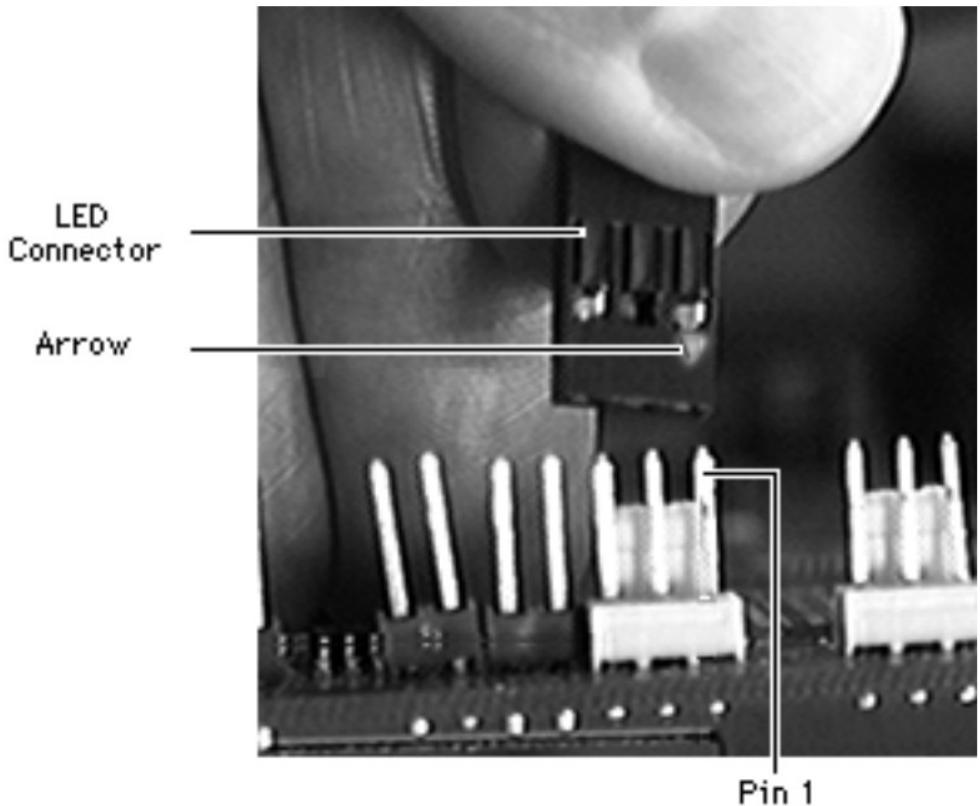




- 3 Raise up the front of the logic board and pull the external ports out of the access holes in the rear of the chassis. Guide the logic board away from the power supply.

Replacement Note: Gently pull the power switch and speaker cables into the opening over the speaker/fan assembly to keep the wires from being covered by the logic board. Tilt the logic board up slightly to insert the external ports on the logic board into the access





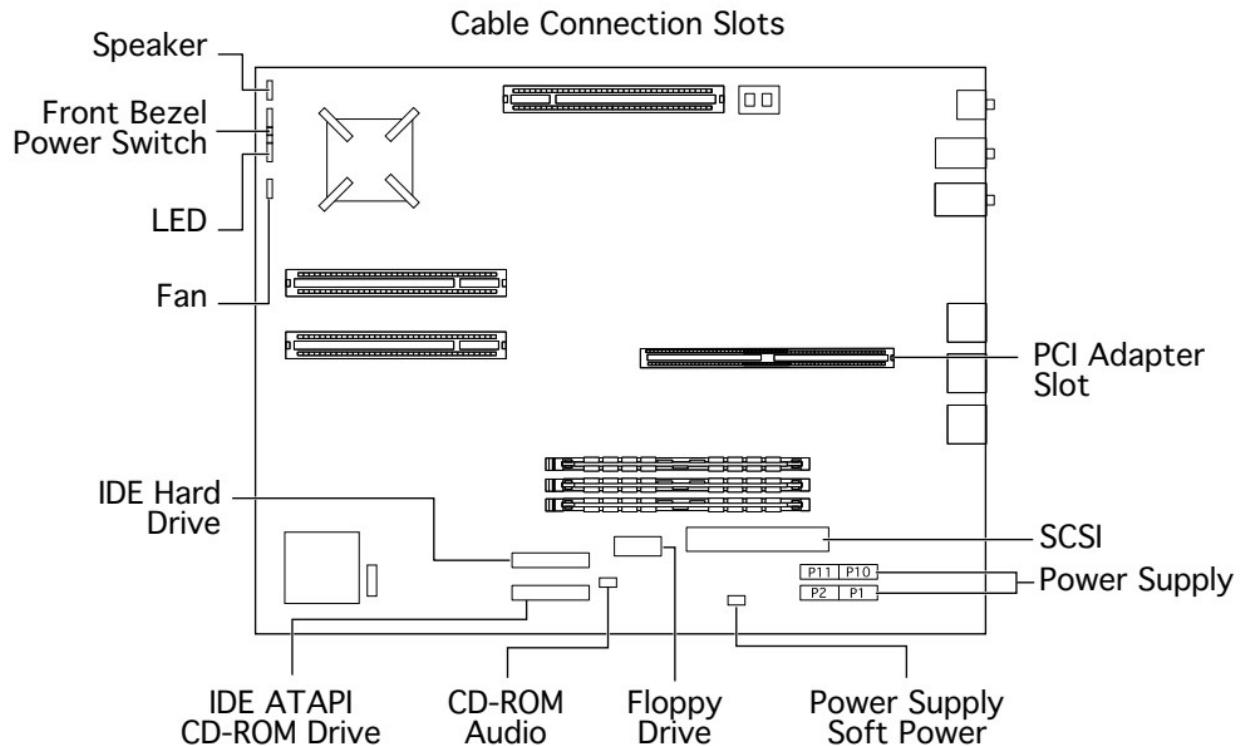
holes in the back of the chassis. Lower the front of the logic board so that the pegs in the housing base fit into the logic board holes. Press the front edge of the logic board down until the release tab clicks. Connect all cables to the proper sockets on the logic board. (See the diagram on the next page. Two 4-pin connectors from the power supply have no sockets, and will remain unconnected.) The LED connector must be plugged in so that the arrow goes over pin 1 on the logic





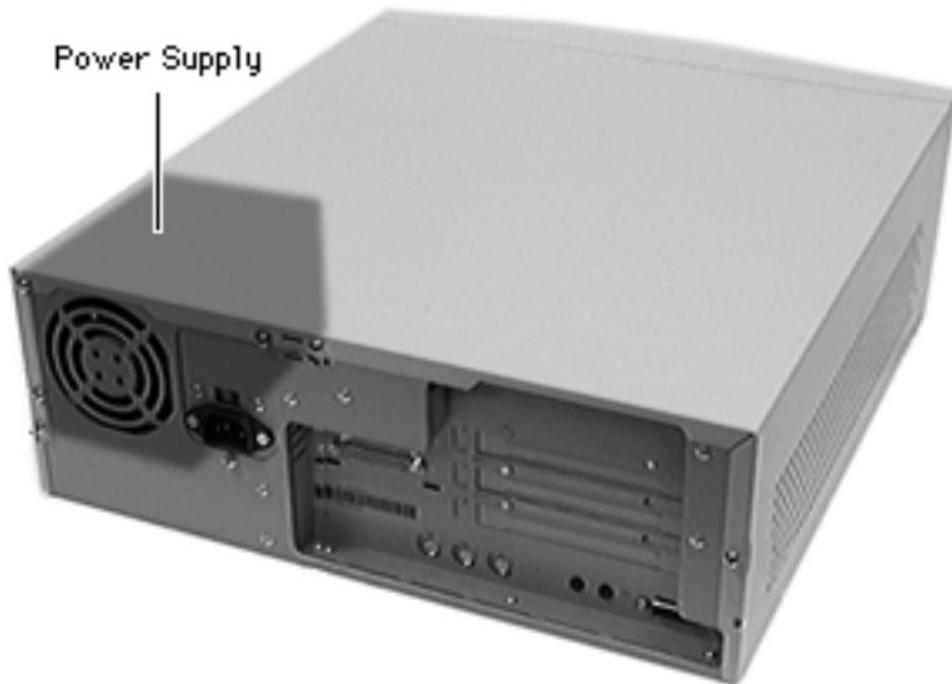
board.







Power Supply



Before you begin, remove the following:

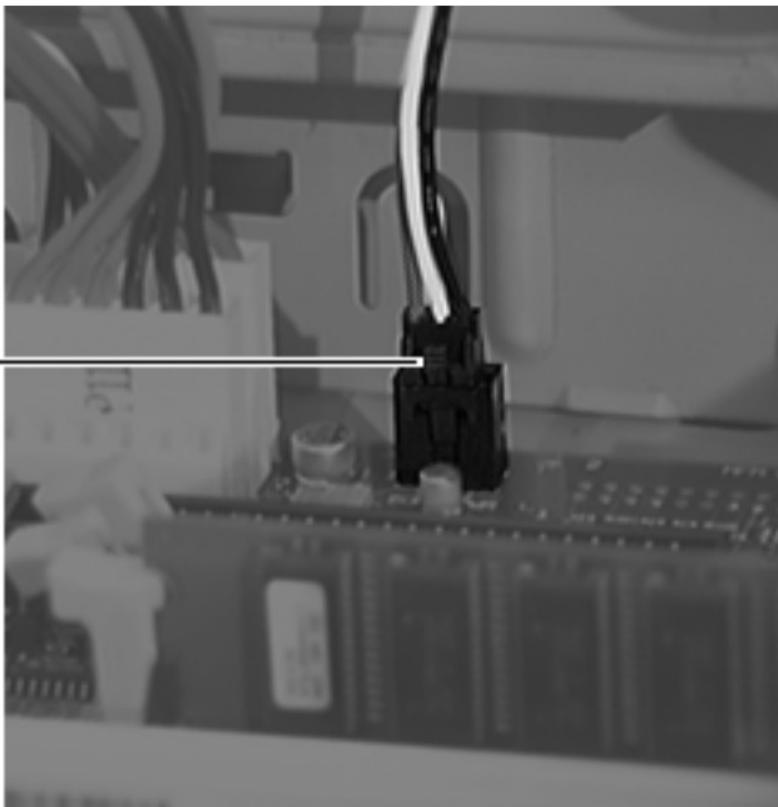
- Top housing
- Link bar
- Hard drive carrier

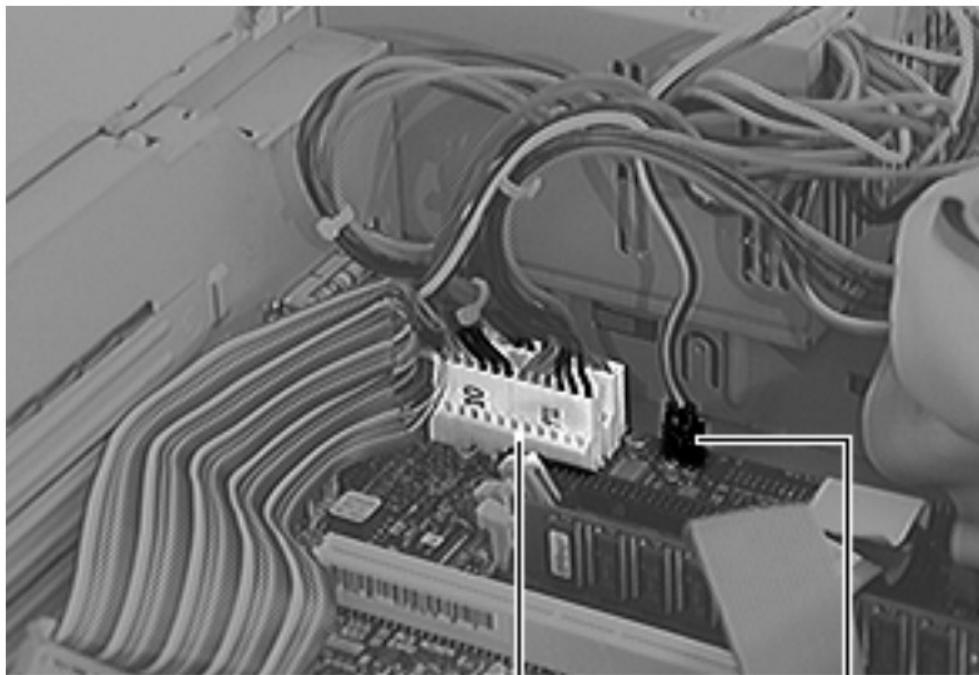
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 **Note:** Press the release tab of the soft-power connector to remove it.





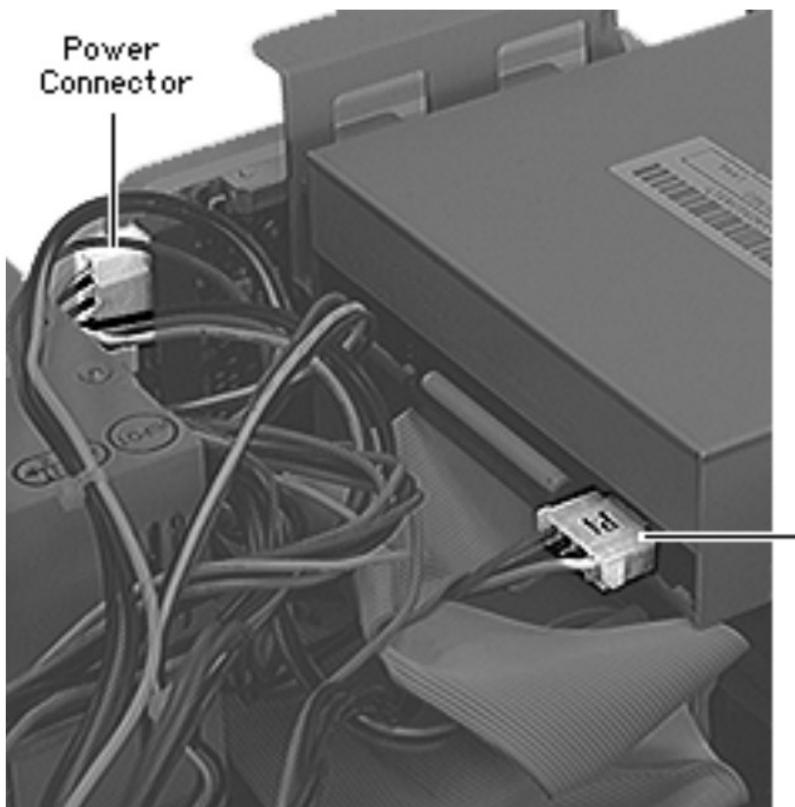
Power Supply Sockets Soft Power Socket

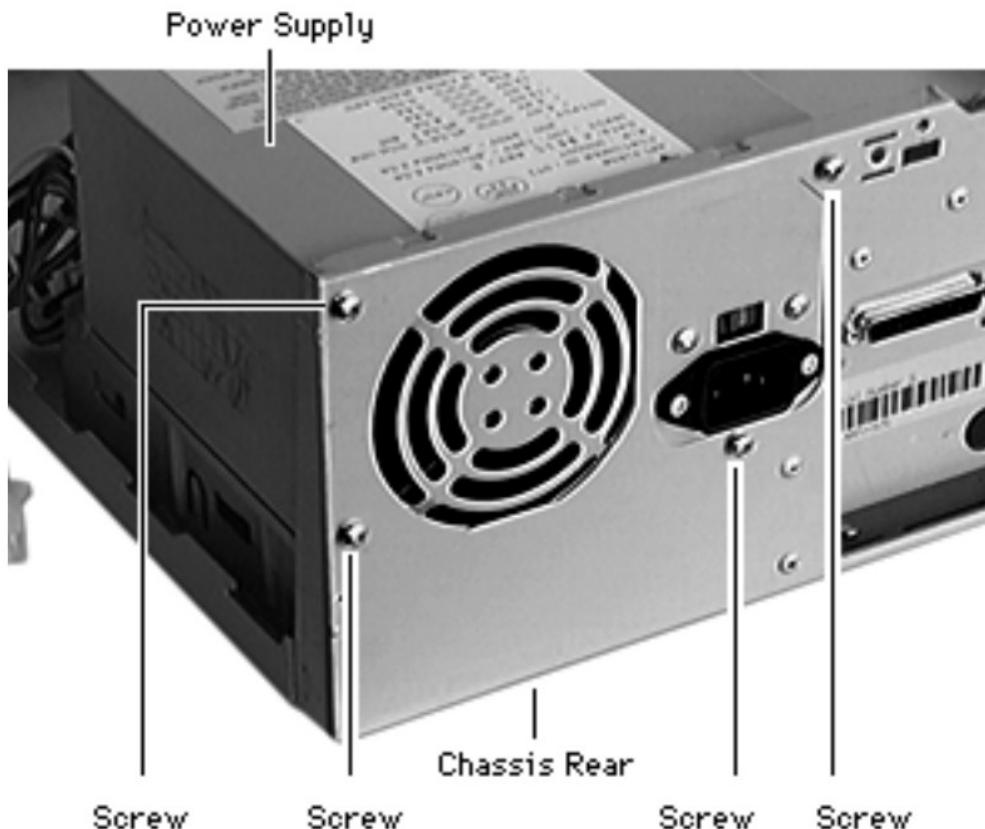
Disconnect the five power supply cables from the logic board sockets.



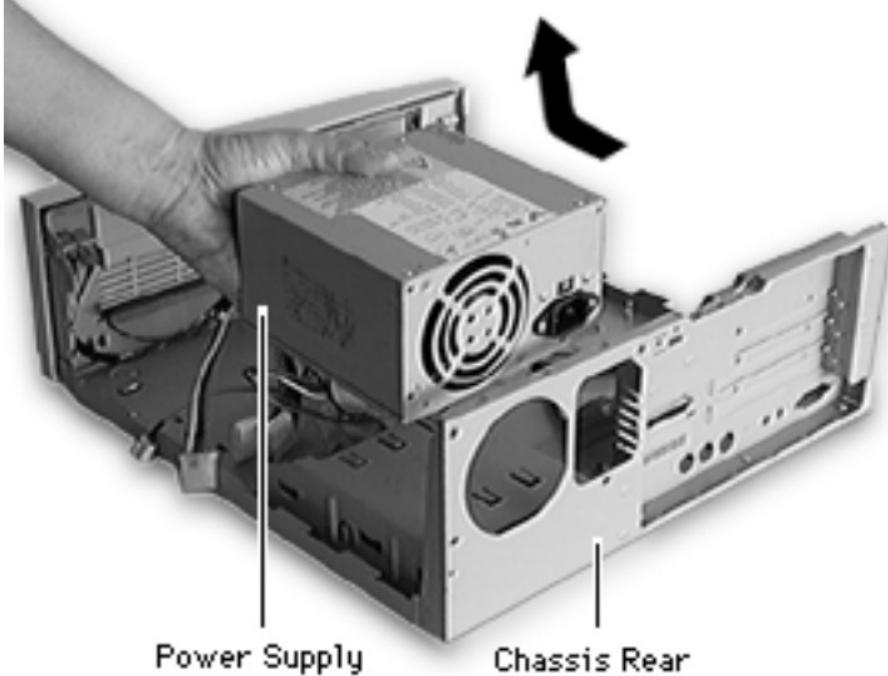


- 2 Disconnect the power supply connectors from the hard drive and CD-ROM drive.





- 3 Remove the 4 screws that secure the power supply to the rear of the chassis.



- 4 Push the power supply about one cm from the rear of the chassis and lift it out of the computer.

Replacement Caution: The power supply cable connectors that attach to the logic board are keyed with matching notches. It is possible to force the connectors into the wrong sockets, and this could cause serious damage to the computer. Be sure the connectors are in the correct sockets.





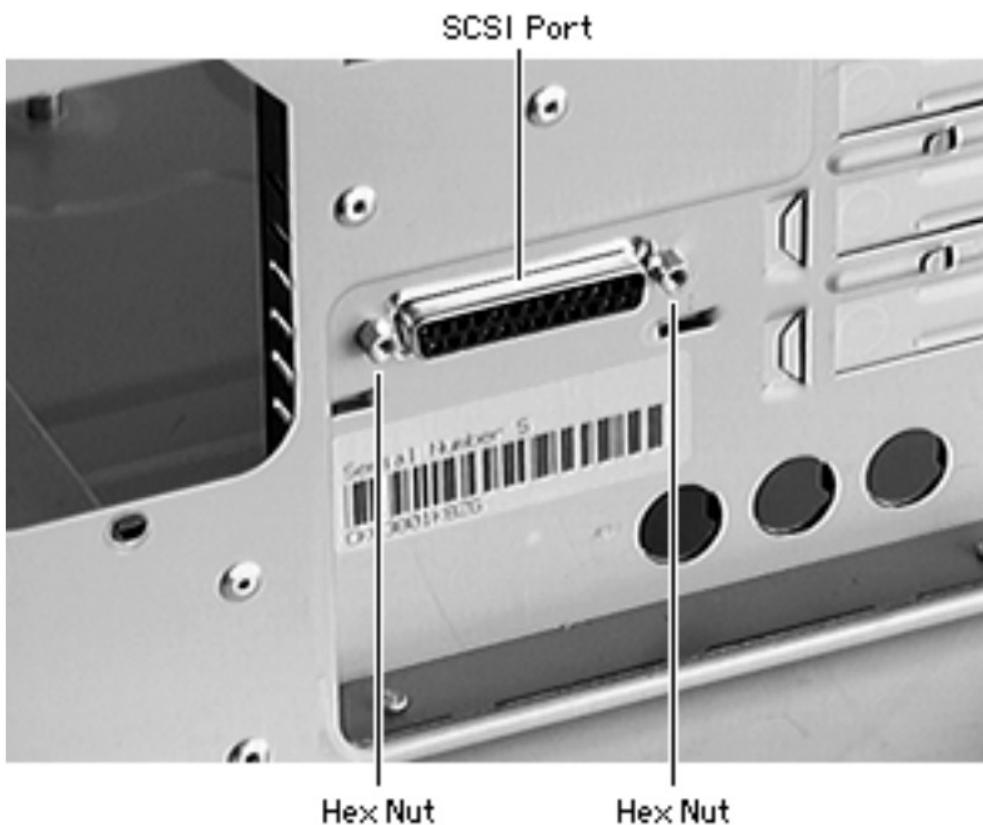
SCSI Cable

Before you begin, remove the following:

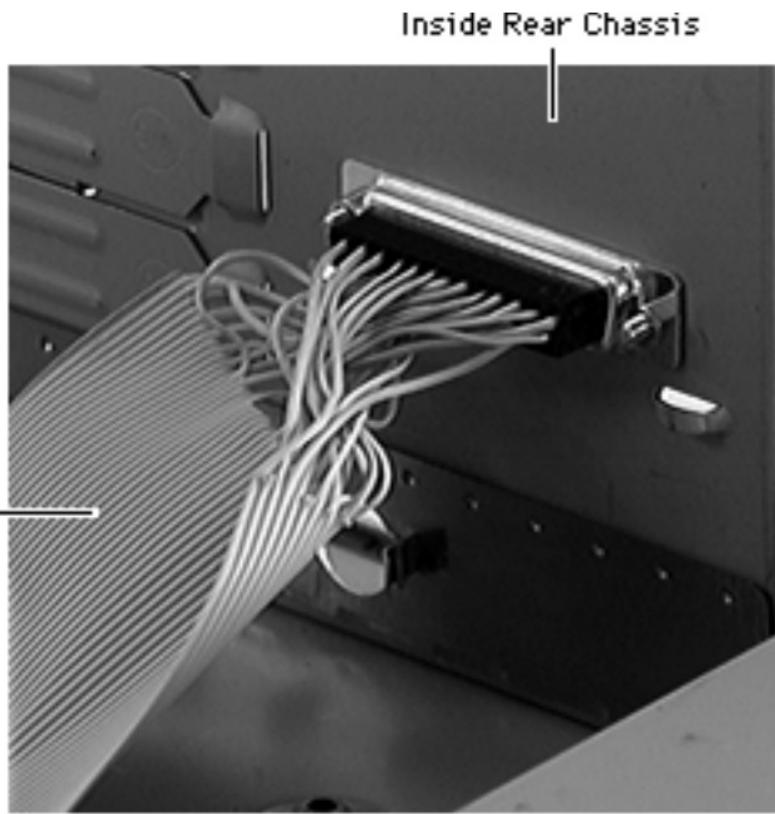
- Top housing
- Link bar
- PCI adapter card

Caution: Review the ESD precautions in Bulletins/Safety.

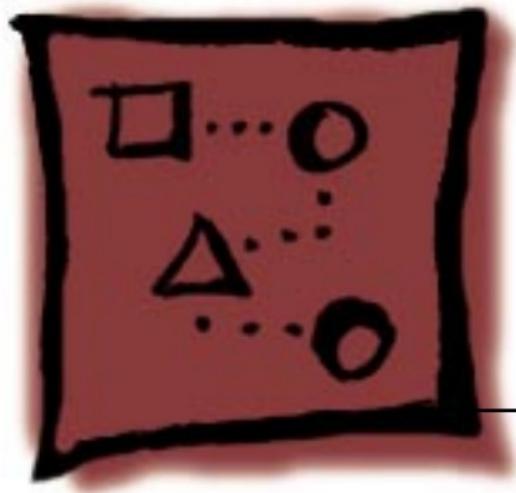




- 1 Remove the two hex nuts that secure the SCSI cable to the rear of the chassis.

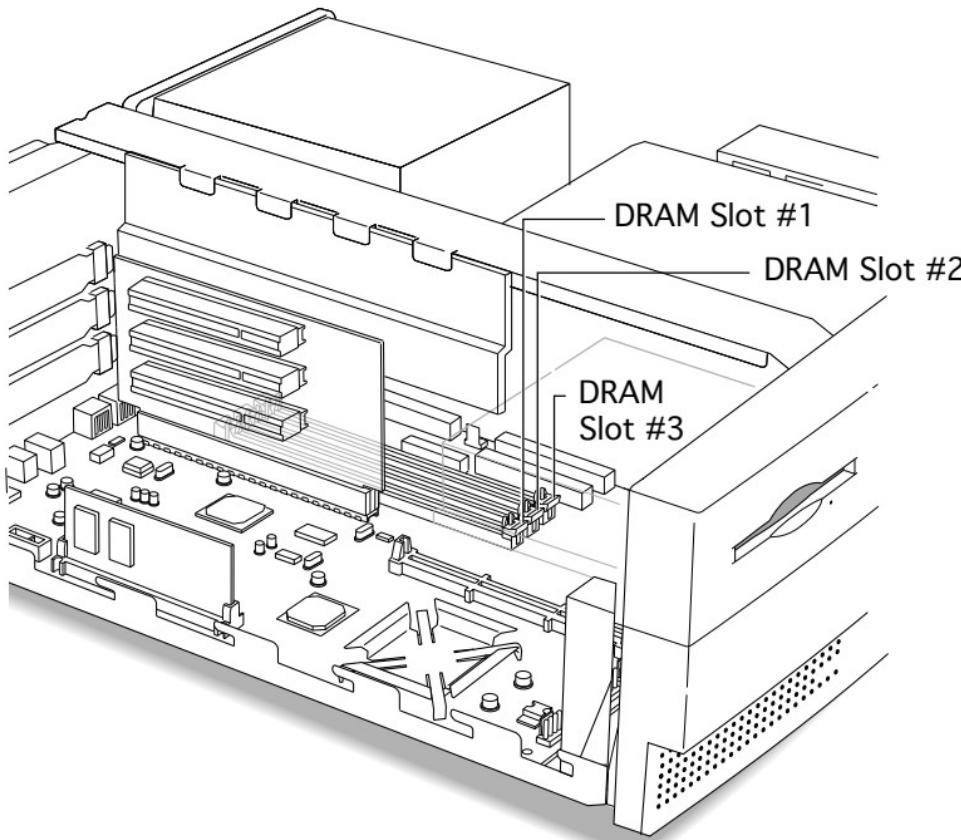


- 2 Disconnect the SCSI cable from the logic board.
- 3 Remove the SCSI cable from inside the chassis.



Upgrades

Power Macintosh 4400



DRAM DIMM

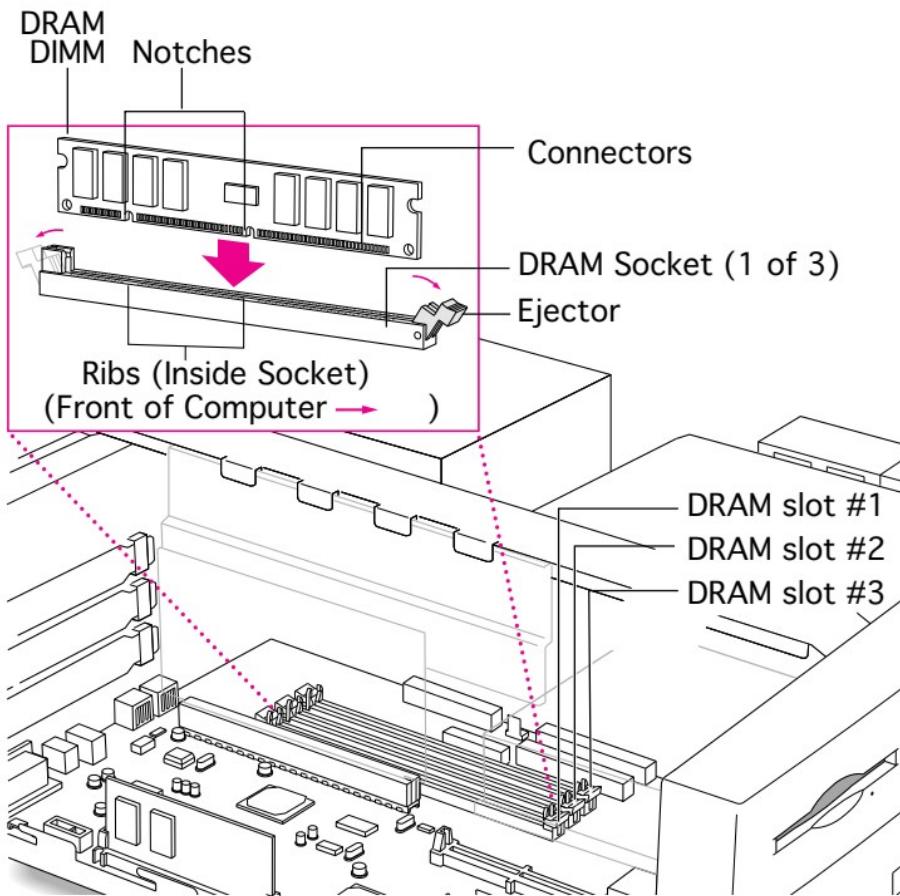
Before you begin, remove the following:

- Top housing
- Link bar
- PCI adapter card

Caution: Review the ESD precautions in Bulletins/Safety.

Note: The DRAM sockets are located behind the PCI adapter card that supports the PCI cards in the computer.





- 1 Push the ejector on the DRAM slot outward and down to open it.
- 2 **Note:** Do not touch the DIMM connectors. Handle the DIMM only by the edges.

With the ejector in the open position, align the DRAM DIMM notches with the small ribs inside the socket.
- 3 Push down on the DIMM until it snaps into place. The ejector will automatically close.

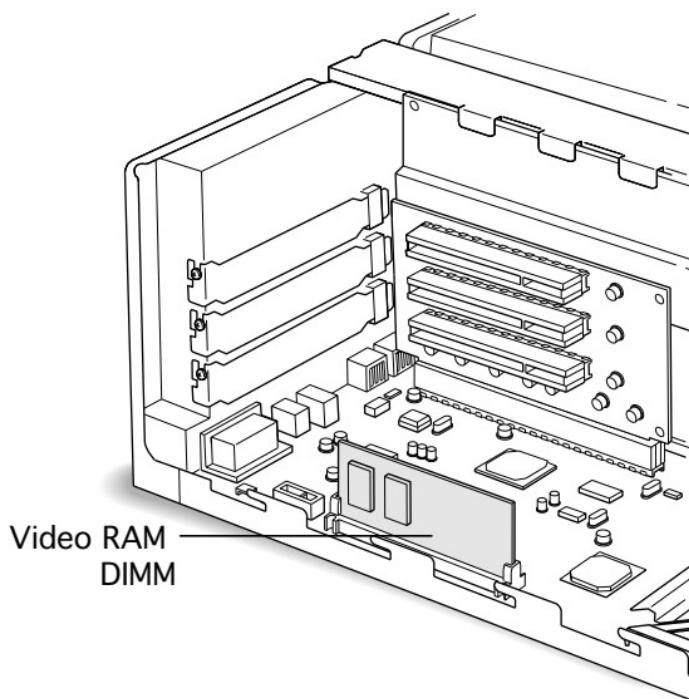


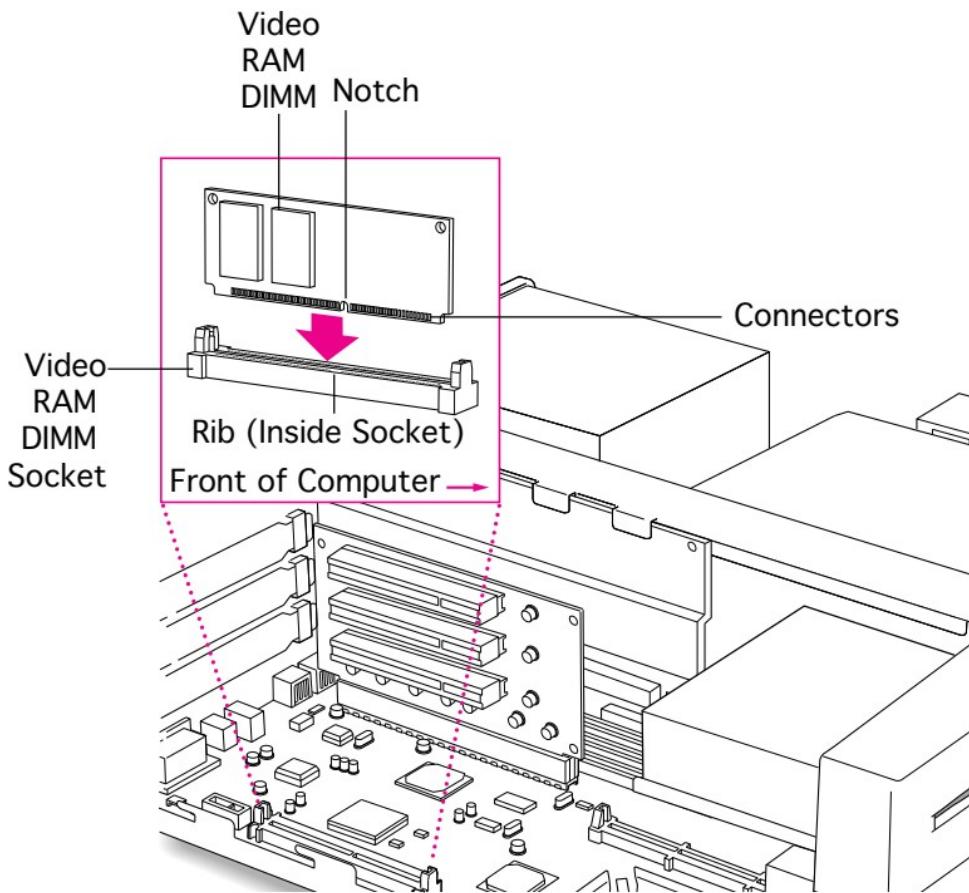


Video RAM DIMM

Before you begin, remove the top housing.

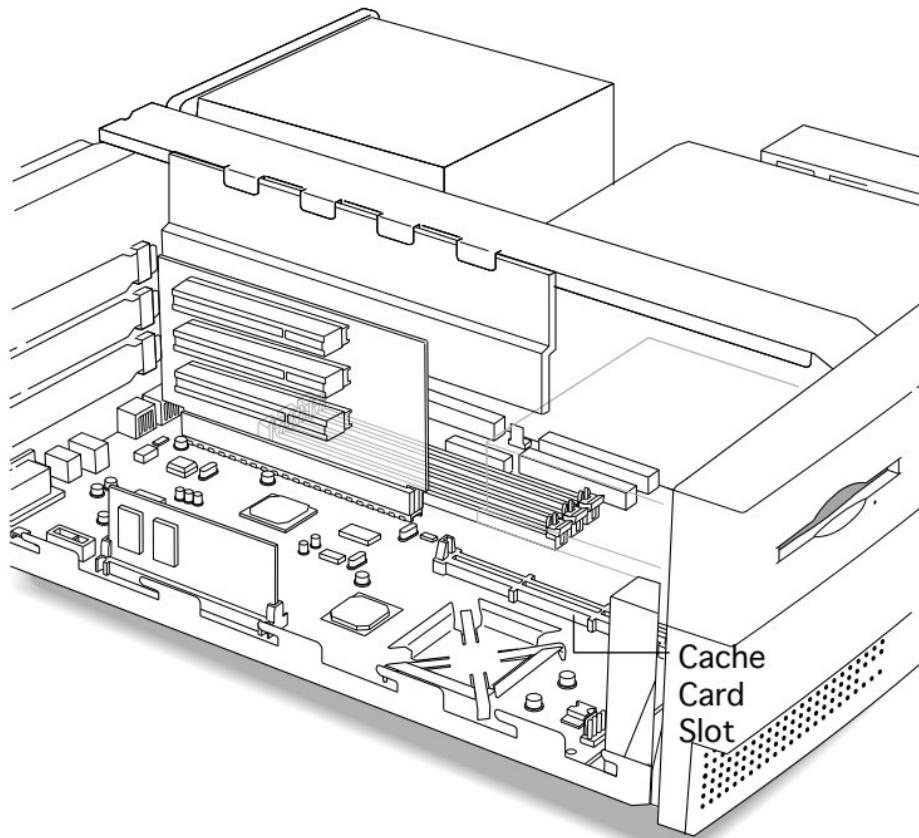
Caution: Review the ESD precautions in Bulletins/Safety.





- 1 **Note:** Do not touch the video RAM DIMM connectors. Handle only by the edges.
Align the notches in the video RAM DIMM with the small ribs inside the module slot, and insert the module into the slot.
- 2 Push down on the DIMM until it snaps into place.



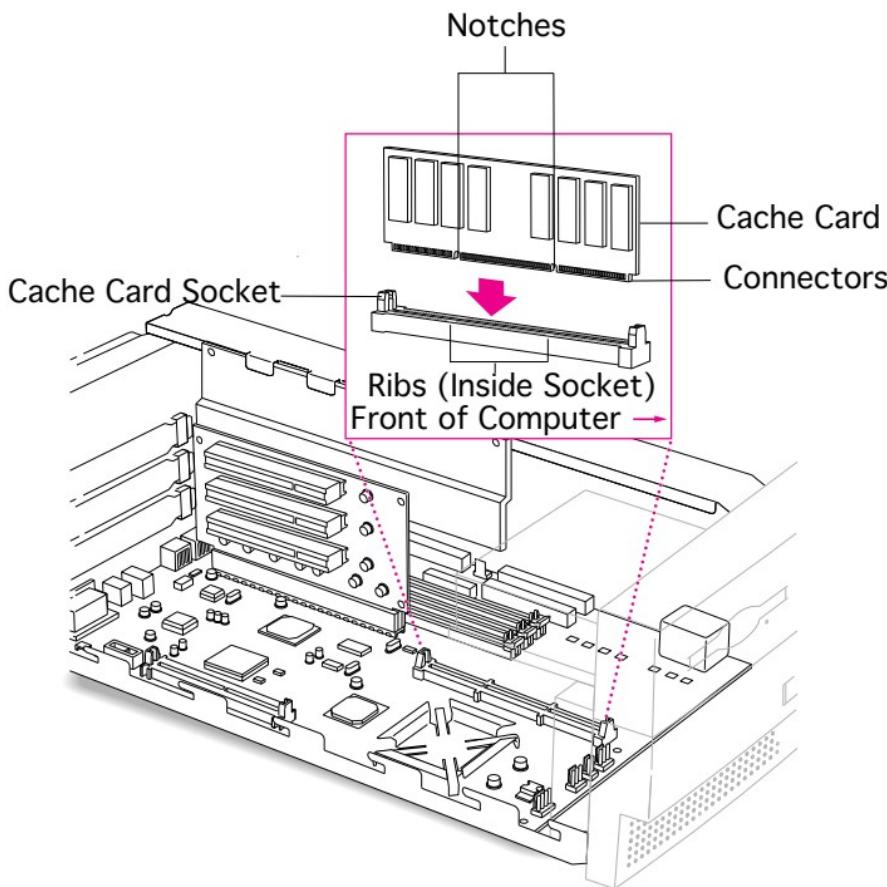


Cache Card

Before you begin, remove the top housing.

Caution: Review the ESD precautions in Bulletins/Safety.



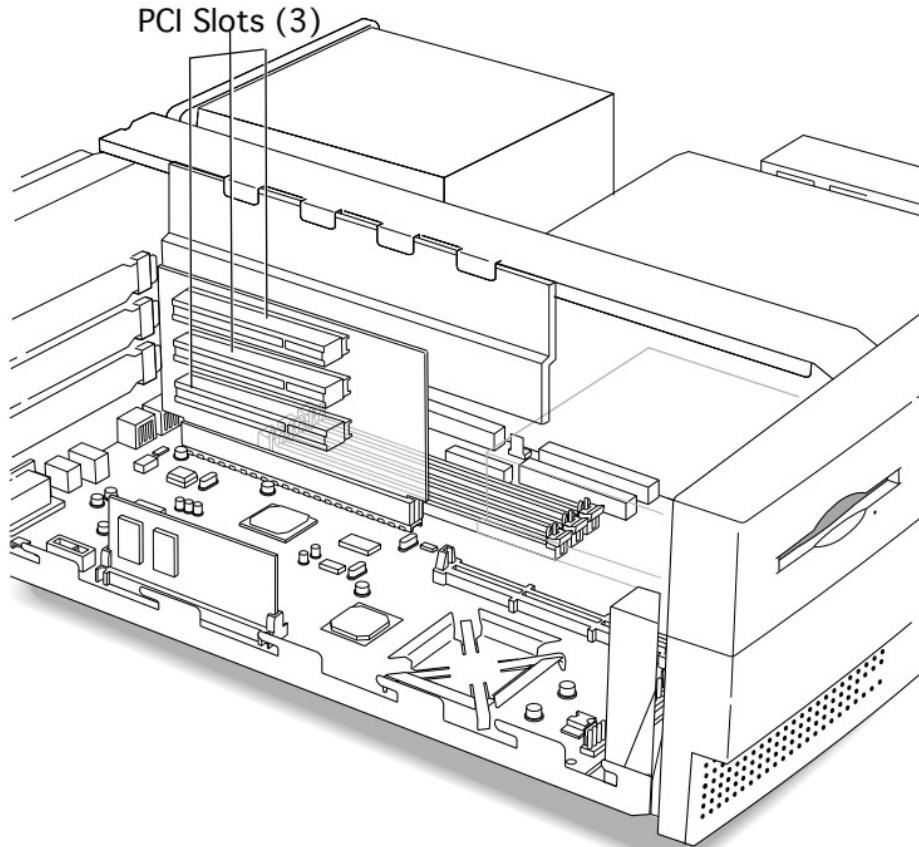


Note: The cache card is designed to fit into the slot only one way.

Note: Do not touch the connectors. Handle only by the edges.

Align the notches in the cache card with the small ribs inside the card slot, and insert the card into the slot.





PCI Card

Before you begin, remove the top housing.

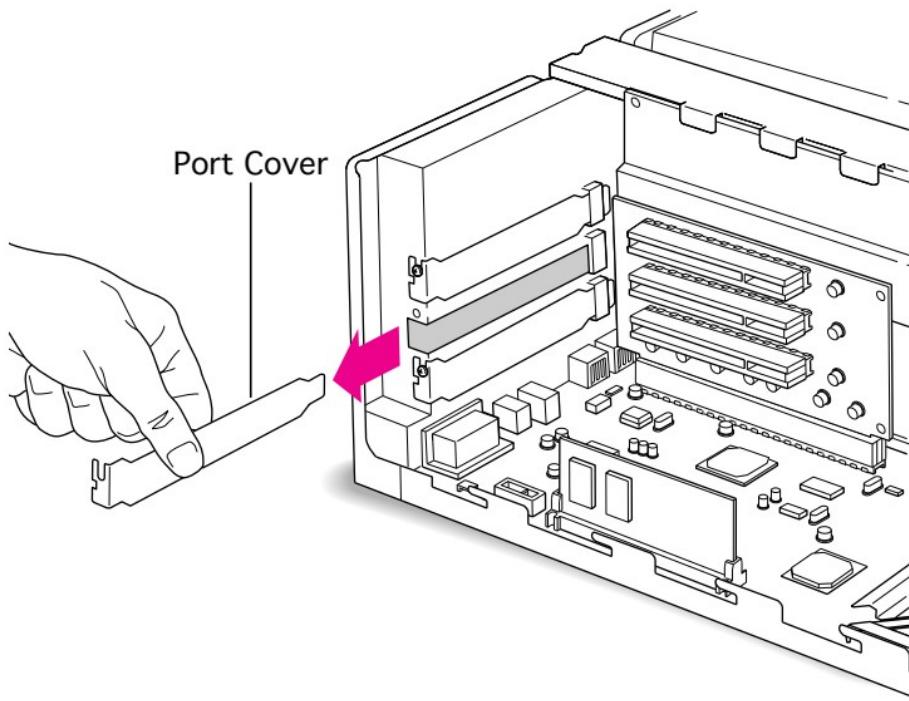
Caution: Review the ESD precautions in Bulletins/Safety.

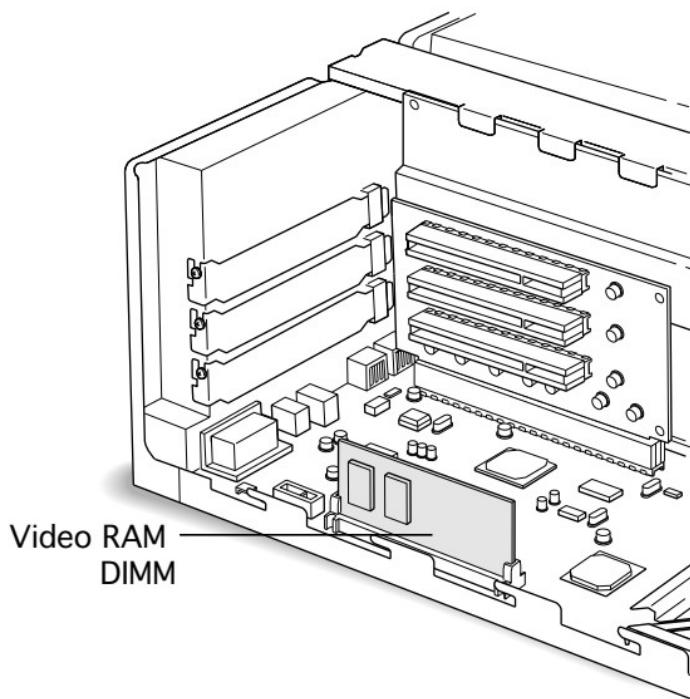
Note: A 6.88-inch card fits in all three slots of a Power Macintosh 4400/160. A 6.88-inch card fits in the top two slots of the Power Macintosh 4400/200 and 7220/200. A 12-inch card fits in the middle slot only.





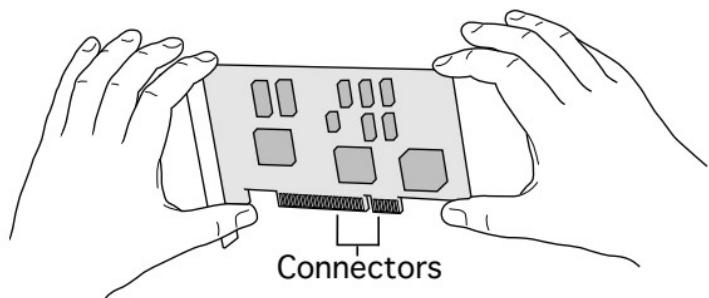
- 1 If the PCI card has ports for connecting equipment, remove the port access cover.





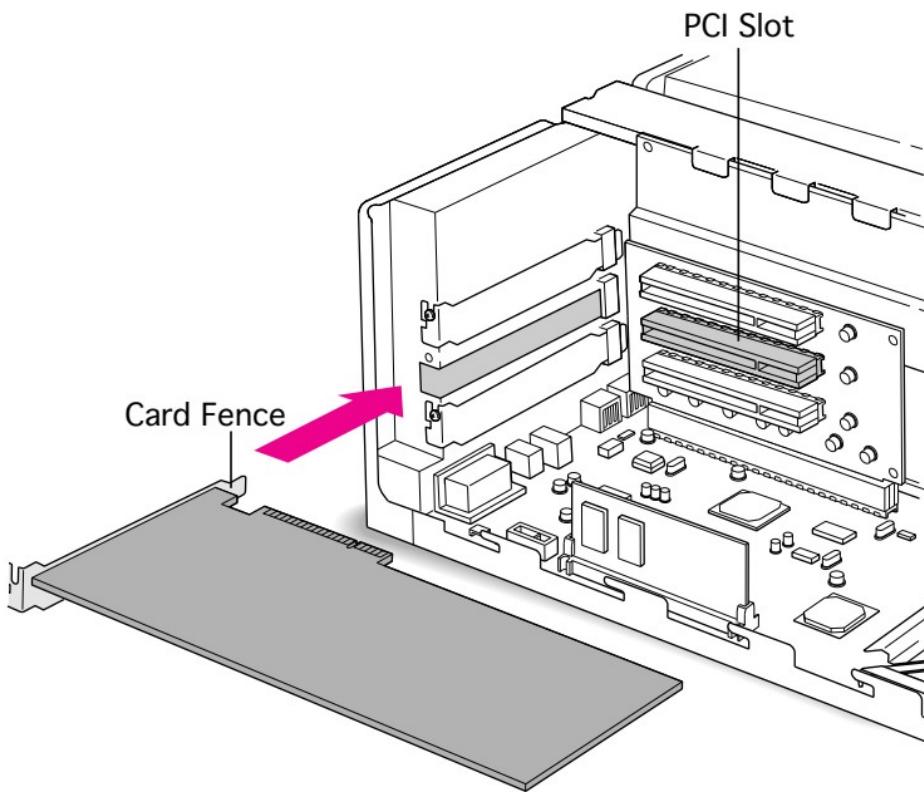
- 2 To install a PCI card in the bottom slot of the Power Macintosh 4400/160, you must temporarily remove the video RAM DIMM. Press down on the video RAM DIMM slot while pulling up on the video RAM DIMM.





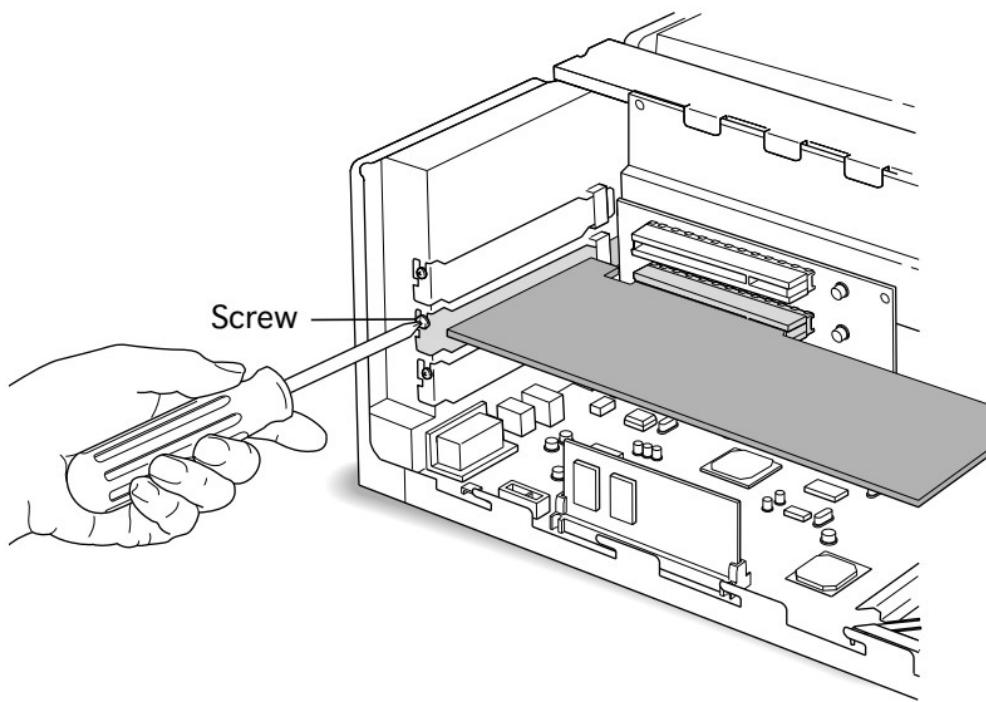
- 3 Remove the PCI card from the static-proof bag, holding it by the edges to avoid touching any connectors.



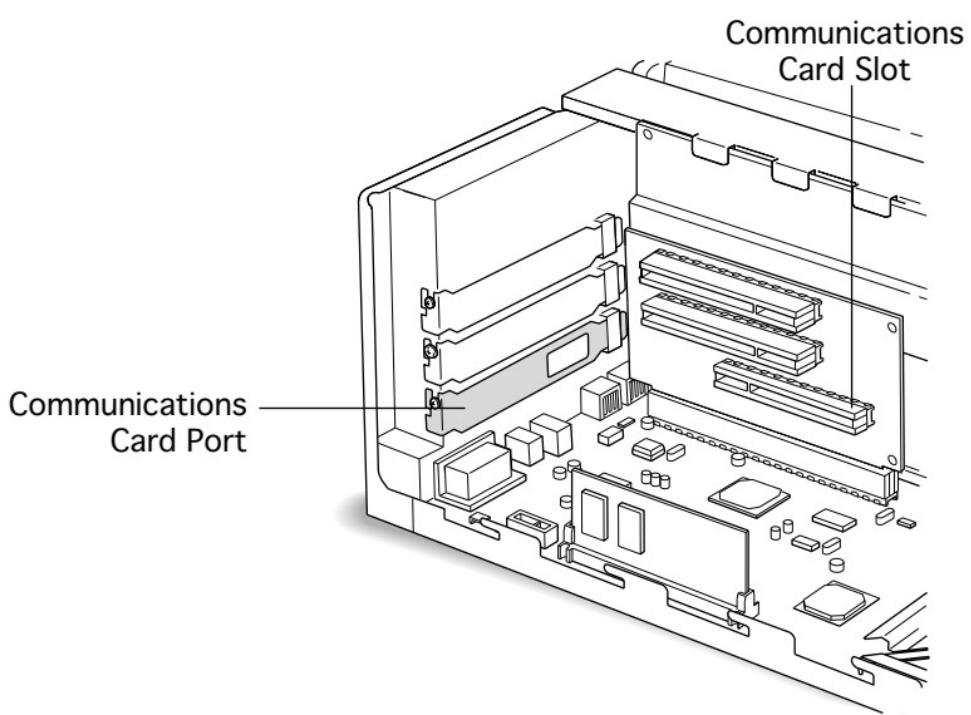


- 4 Insert the PCI card into the PCI slot, aligning any ports on the card with the port access opening. Press the card firmly into the slot.





- 5 Reinstall the screw removed from the port access cover.
- 6 If you removed the video RAM DIMM, reinstall it.



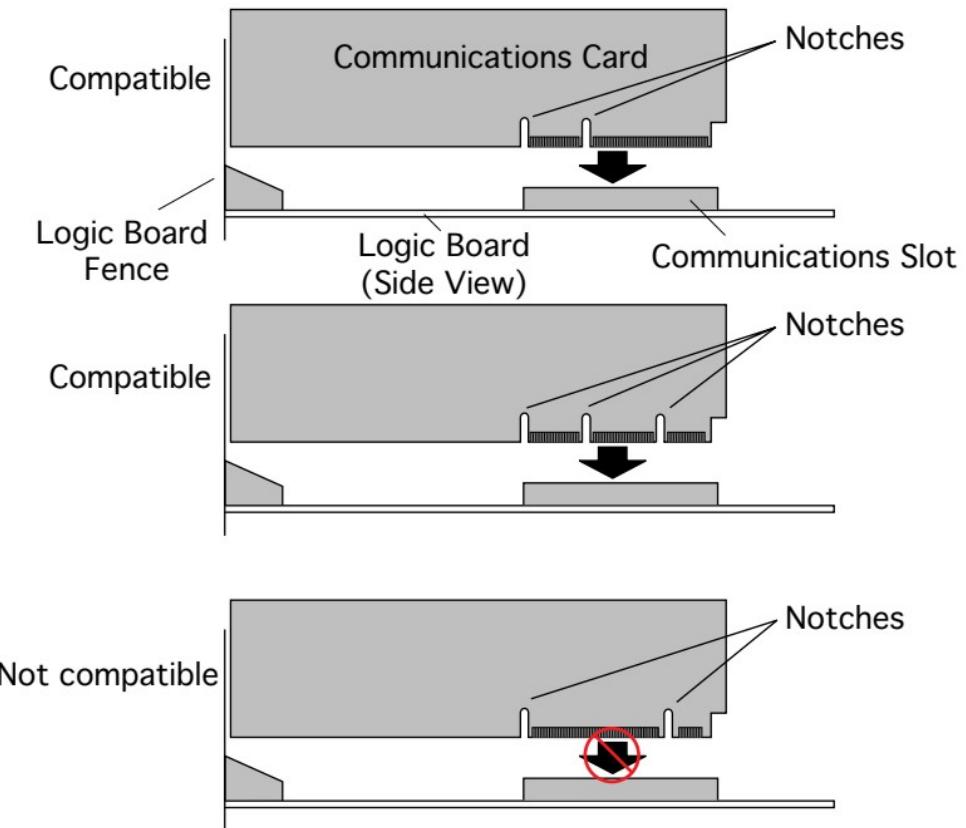
Communications Card

Before you begin, remove the top housing.

Caution: Review the ESD precautions in Bulletins/Safety.

Note: A communications card can only be installed in the bottom slot of the adapter card in a Power Macintosh 4400/200 or 7220/200. An Ethernet or internal modem card may be installed here. If a customer

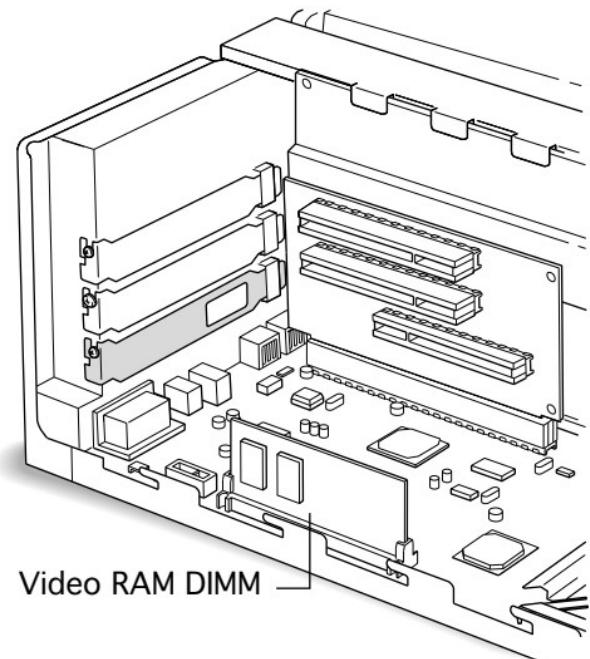




wants both Ethernet and internal modem cards, install an Ethernet PCI card in one of the upper slots and install the modem card in the lower communications slot.

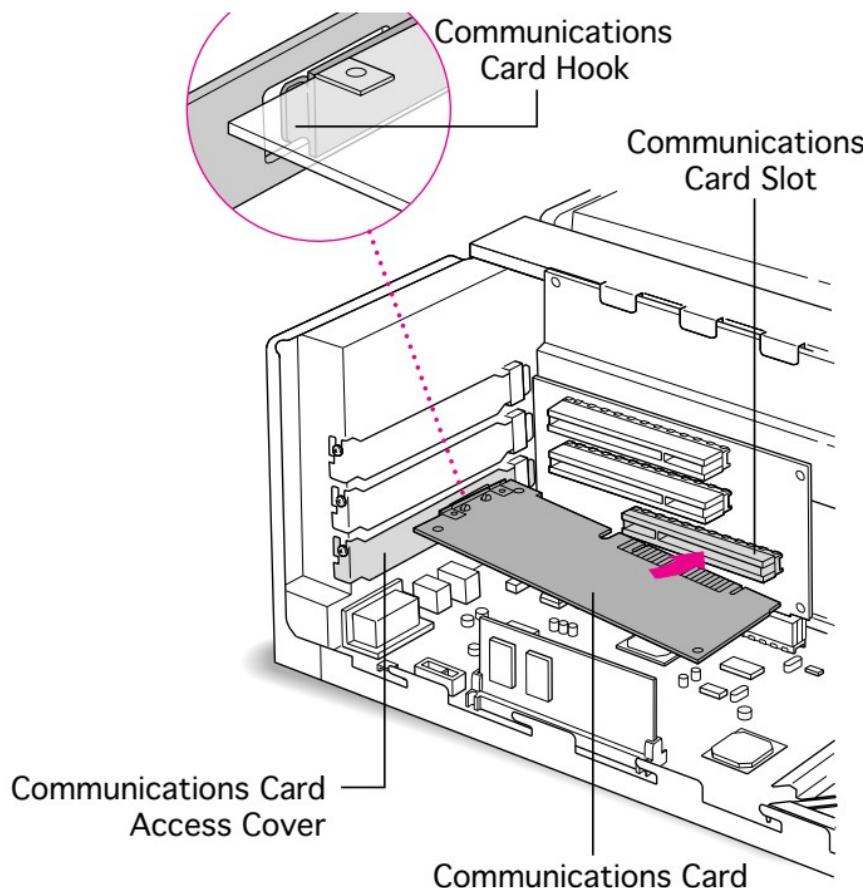
Note: Some communications cards are not compatible. Look at the placement of the notches on the card, and use this illustration to help identify a compatible card.





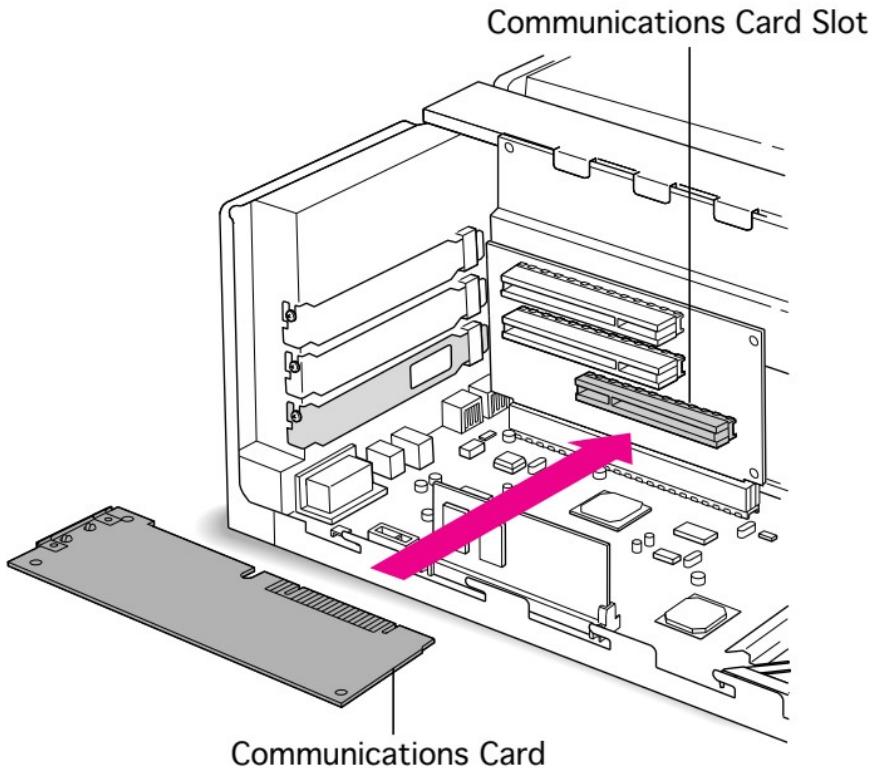
- 1 **Note:** You may need to temporarily remove the video RAM DIMM.
To remove the video RAM DIMM, press down on the video RAM DIMM slot while pulling up on the video RAM DIMM.
- 2 Remove the communications card from its static-proof bag, and hold the card by its edges to avoid touching the connectors.





- 3 If the card has a hook, be sure it engages the hole in the access cover.





- 4 If the card doesn't have a hook, pass the external connector through the opening in the access cover.
- 5 Insert the card into the communications slot. If it meets resistance, pull the card out and reinsert the connector. Press solidly into place.
- 6 Check the connection by lifting the card gently. If it resists and stays in place, it is solidly connected.





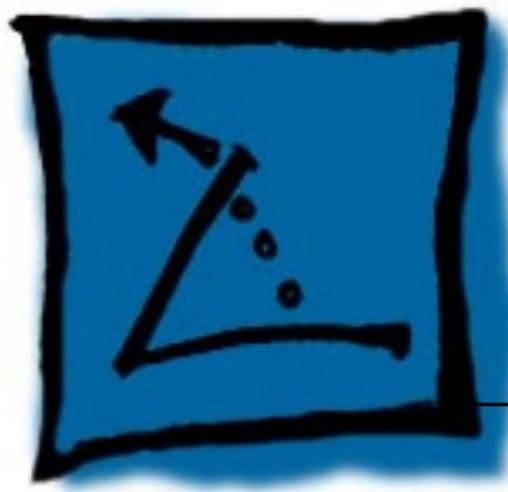
- 7 If you removed the video RAM DIMM, replace it following the steps in the “Video RAM DIMM” section of this chapter.

Note: Communications software may need to be installed for the card to work. Also, for an Ethernet card, the network connection in the AppleTalk control panel may need to be changed. See the manual that came with the card.



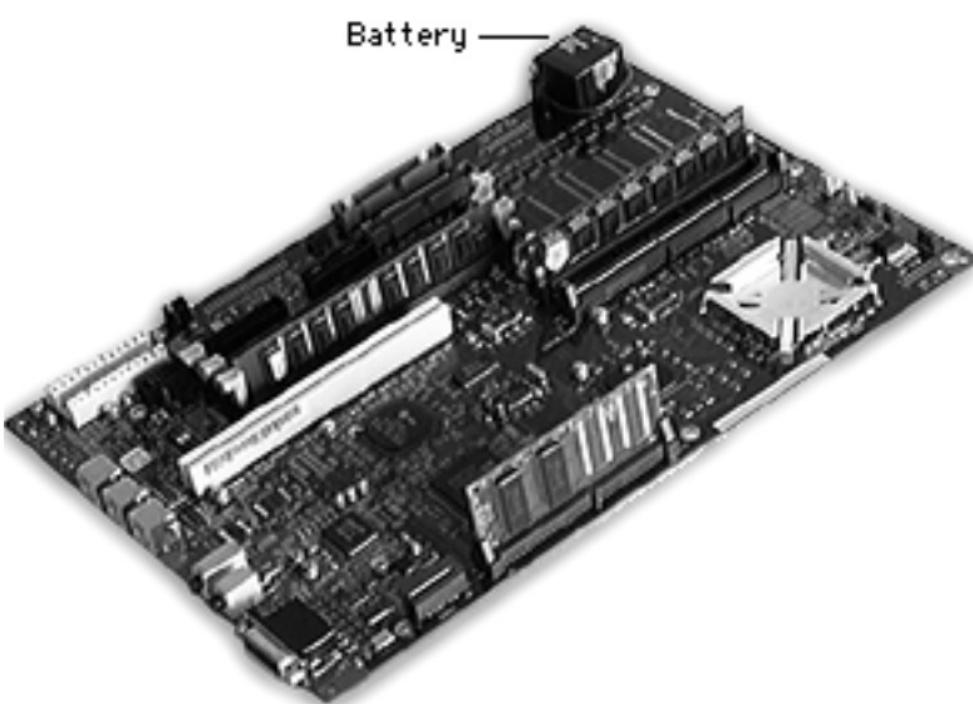
PC Compatibility Cards

For information about these cards and installation instructions, refer to the PC Compatibility Card manual on this Service Source CD.



Additional Procedures

Power Macintosh 4400



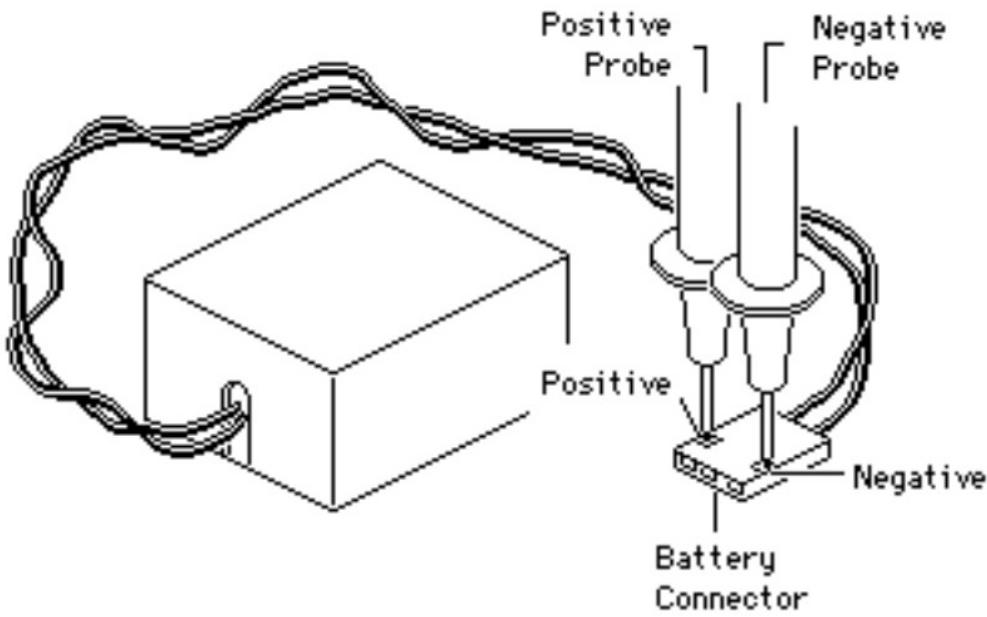
Battery Verification

Before you begin, remove the following:

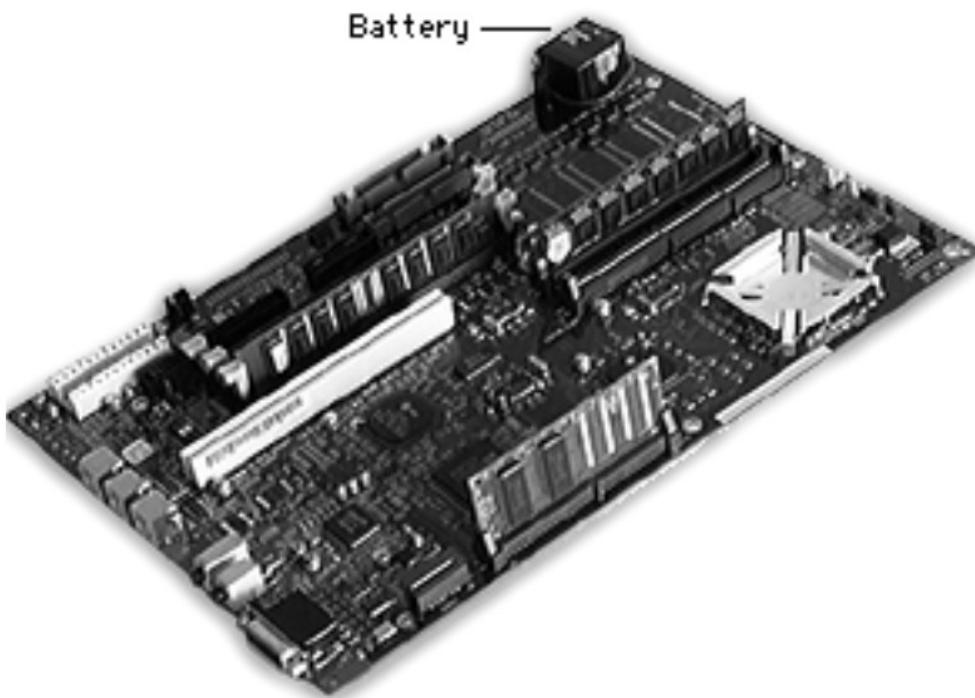
- Top housing
- Link bar
- Hard drive carrier
- Floppy/CD-ROM drive carrier

Caution: Review the ESD precautions in Bulletins/Safety.





- 1 Disconnect the battery connector.
- 2 Set the voltmeter to the 10 volts DC scale.
- 3 Hold the positive probe of the voltmeter to the positive end of the battery connector and the negative probe to the negative end of the battery connector.
- 4 If the battery voltage is below 3.0 volts, replace the battery. Refer to "Battery Replacement" in this chapter.



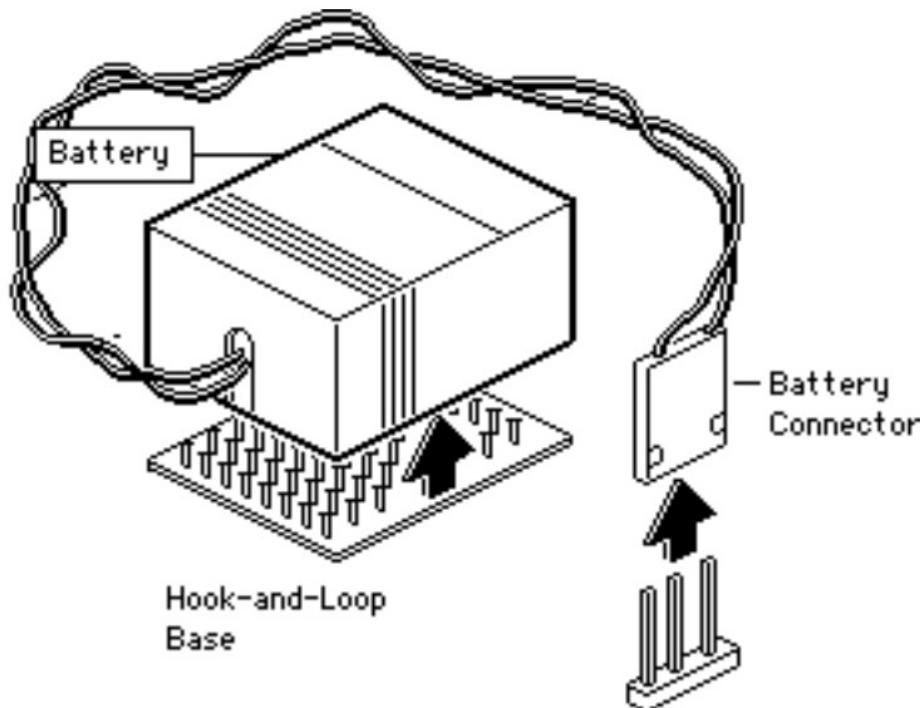
Battery Replacement

Before you begin, remove the following:

- Top housing
- Link bar
- Hard drive carrier
- Floppy/CD-ROM drive carrier

Note: Battery location is different in 4400 computers sold in Germany. See "Battery Replacement for 4400s Sold in Germany" in this chapter.



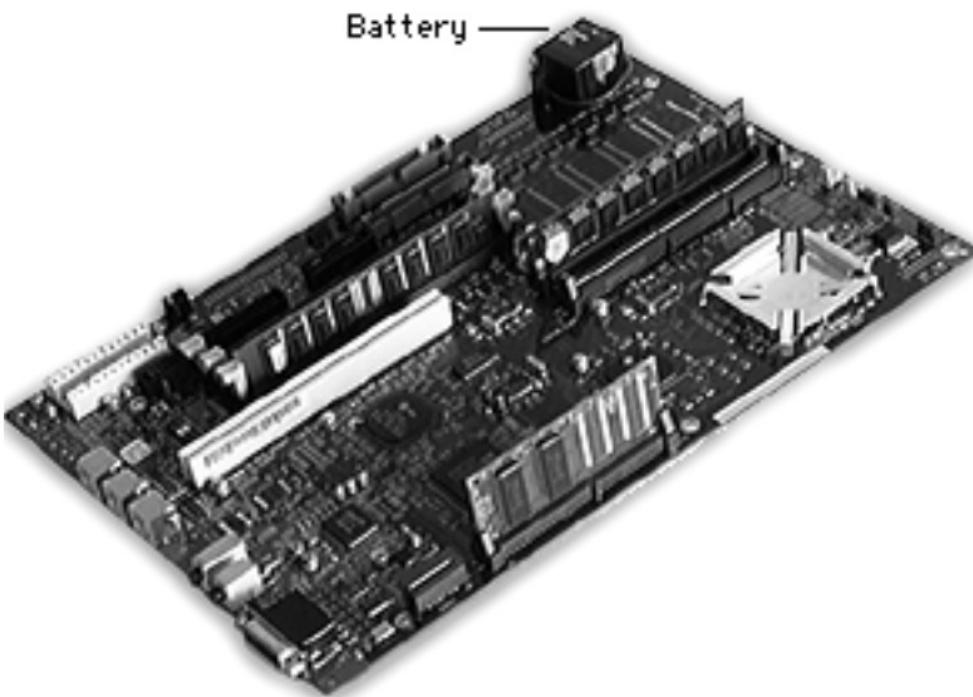


Caution: Review the ESD precautions in Bulletins/Safety.

- 1 Pull up and disconnect the connector.
- 2 Pull up and remove the battery from its hook-and-loop base.
- 3 Install the new battery.



Logic Board Reset

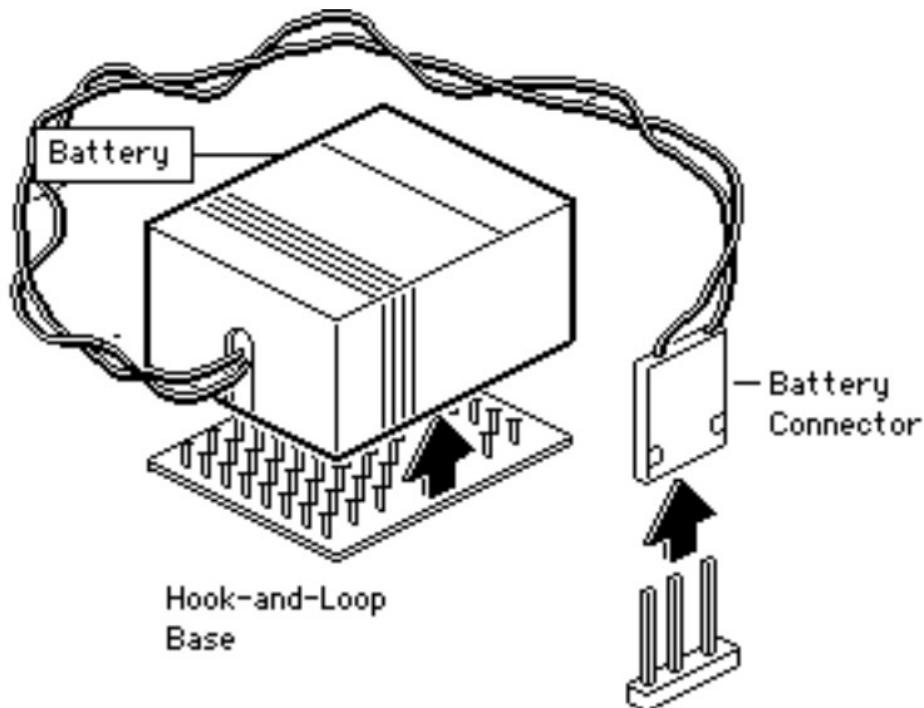


Before you begin, remove the following:

- Top housing
- Link bar
- Hard drive carrier
- Floppy/CD-ROM drive carrier

Caution: Review the ESD precautions in Bulletins/Safety.





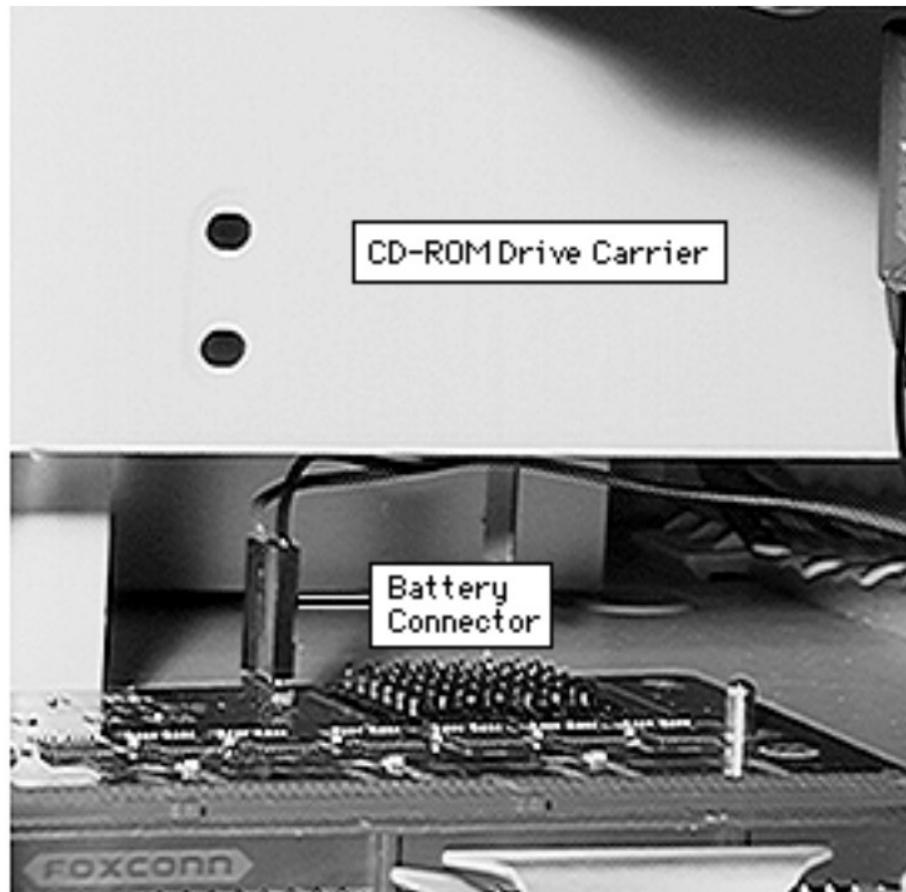
- 1 Pull up and disconnect the battery connector.
- 2 Pull up and remove the battery from its hook-and-loop base.
- 3 Wait 5-10 minutes and then replace the battery.

Note: This procedure resets PRAM. Be sure to check the computer's time/date and other system parameter settings following the procedure.





Note: If this procedure resolves the problem, claim an adjustment on an SRO. If not, replace any defective parts and **do not** claim the adjustment.

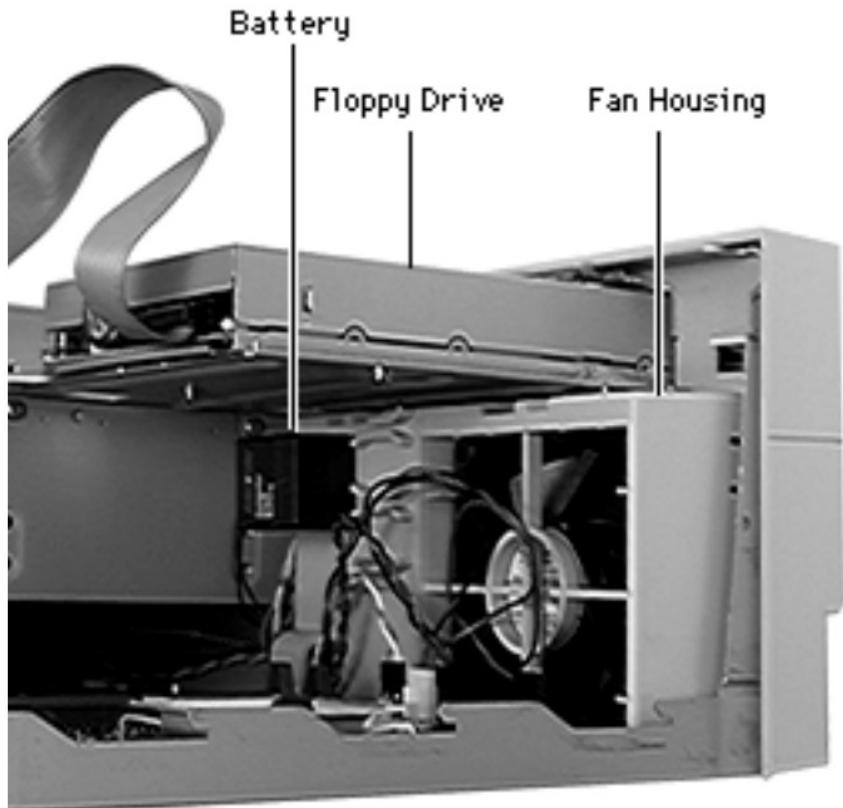


Battery Replacement for 4400s Sold in Germany

Before you begin, remove the following:

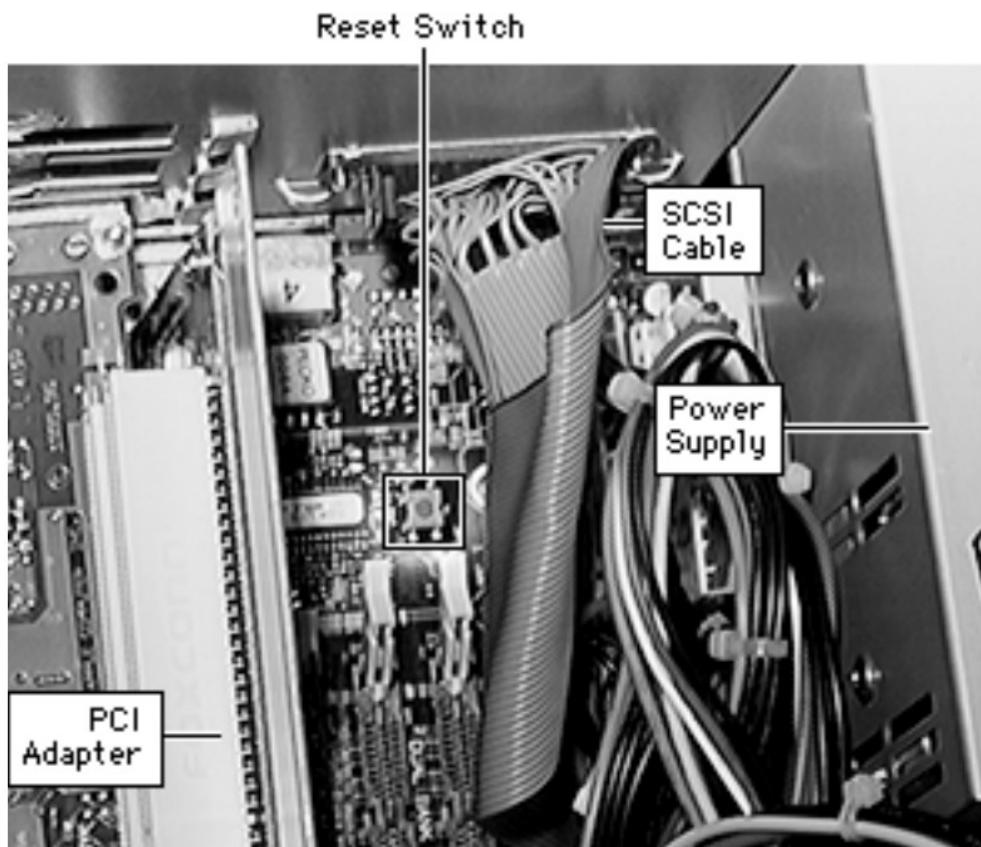
- Top housing
 - Link bar
 - Cache card
- 1 Using needle-nose pliers, pull up and disconnect the battery connector.





- 2 Pull up and twist to remove the battery from its hook-and-loop base.
- 3 Install the new battery and attach the battery connector.



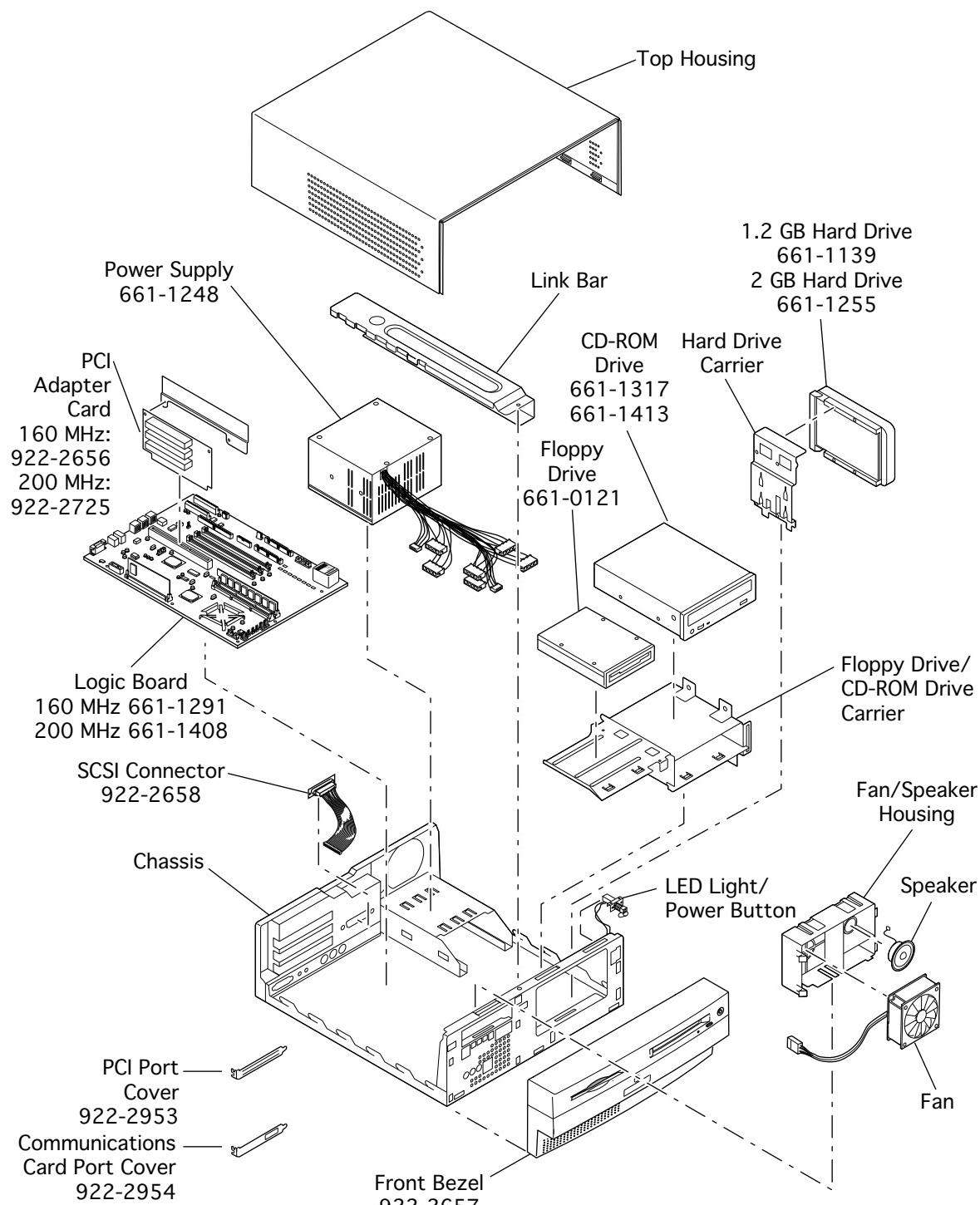


- 4 Press the reset switch on the logic board using a flat plastic tool.



Exploded View

Power Macintosh 4400



922-2862

The Housing Assembly includes the Chassis, LED Light, Power Button, Fan/Speaker Housing, Fan, Speaker, Drive Carriers, Top Housing, Link Bar

